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" Scire est nescire, nisi id me
Scire alius sciret."

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SOME REMINISCENCES AND A FORECAST.*

BY

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BRISTOL has always seemed to me to typify in her professional classes, her business men, and in her social endeavour that combine of solid worth, steady, unfaltering grip, whether in good times or bad, and unheralded point to point attainment, which is summed up in that great word England. We may not wholly agree with Thomas Carlyle that " The English are a dumb people. They can do great acts but not describe them " ; but there is something wholly admirable and, indeed, comforting to the more vocal and demonstrative Celtic fringe in the wise, almost parental tolerance of the predominant partner.

* An address delivered to the Bristol Medico-Chirurgical Society on Wednesday, 11th February, 1931.

My personal knowledge of Bristol began in the last century—I do not mean a century ago, but in 1890—when I was advised to gain some knowledge of general practice by accepting an assistantship in the Lawrence Hill district, and I recall that my then very youthful appearance created some difficulty in my being received as a substitute for my chief by the actively parturient ladies of the East End. In relation to this experience, not altogether rare amongst young practitioners, a senior chief of mine later said to me : " Your physical make-up, Maclean, is like mine. For years I felt handicapped by the impression that I looked too young until one day I overheard someone say that I was too old. Believe me, young man, subjectively, there is no intermediate stage ! " There was, however, some consolatory glamour in the fact that not infrequently the great W. G. Grace and I met to minister to the sick in the same street—though not in the same house, and not, of course, for the same firm.

Then I was House Surgeon for over two years at the Bristol Royal Hospital for Sick Children and Women on St. Michael's Hill, and was a member of this Society, and I trust the records show that I duly paid my subscription. Much to my profit, I was and still am a subscribing member to the *Journal*, which owes so much in its development to the late L. M. Griffiths, the memory of whose qualities and zeal are, I know, still held high among you. The Society assembled in the Old Library, the premises of which were nothing like so palatial or impressive as the beautiful building of to-day ; but I would venture to claim that the functioning of the Society, in all

essentials, could not be bettered. It was there that I, with other recently qualified men, met and was privileged to know the leading members of the profession, and I shall always gratefully remember the kindness and encouragement extended to us as juniors. If I may say so, as succeeding years have conferred the inevitable senior status upon me I have endeavoured to follow their example—surely one of the prime objects of our societies. To mention only a few names, I especially recall Edward Long Fox, Shingleton Smith, Markham Skerritt, Greig Smith, and last but not least, and still happily with us, Richardson Cross.

I came to Bristol from my Alma Mater, Edinburgh University, where in matters surgical antisepsis was dominant, and had not, as yet, given due place to asepsis. The smell and hiss of the carbolic spray assailed ears and nostrils in all the hospitals of the land, and those in Bristol afforded no exception. Buried sutures, including those of rather crudely prepared catgut, were coming more into vogue, and sometimes over-reaching the absorptive capacity of the tissues. Chicken-bone drainage tubes in osteotomy cases failed to disappear in the time and manner it was intended they should, and contributed to some unsatisfactory results. At the Children's Hospital I made myself responsible for the collection and preparation of the chicken bones of appropriate size and shape, and the response of my social friends became so cordial and active in the matter of collection as to create some embarrassment and even to affect appreciably the corresponding poultry market—as was jocularly suggested.

It is interesting to recall the then phase of the treatment of tuberculosis by Koch's tuberculin, which, discarding the precautions and reservations which accompanied the pronouncement by that great man, spread like putting a match to the heather, with, in many instances, devastating results. I obtained leave to witness the methods then employed in London. A very distinguished friend of mine was amongst the victims who succumbed to the unguarded enthusiasm of the movement before a more matured experience determined the limits of safety and utility.

I made many friends amongst the resident staffs of the Bristol Royal Infirmary and the Bristol General Hospital, and it was not difficult to discern the friendly rivalry between the two institutions, which was rooted in the remoter days when the feuds between Dolphinites and Anchorites were affairs of even more than wind and limb. No member of this Society, I imagine, is unacquainted with Augustin Prichard's brochure on "The Early History of the Bristol Medical School," in which it is related that the Bristol Royal Infirmary being the first of the two hospitals to obtain royal recognition, a certain Mr. Sanders, whose sympathies with one of them were not disguised, gave expression to the historic adage that "The patients who want a Sovereign remedy will now go to the Royal Infirmary; but those who want a Radical cure will go to the Hospital!" To what extent, if any, that injunction was at that time acted upon or has since been observed, it is not for a privileged guest to inquire or even to surmise.

It would appear that in those days the partisanship of the Bristol layfolk in matters medical was to some

extent political, and Augustin Prichard submits—to quote again from his pamphlet — an interesting observation on their attitude toward movements other than commercial. He says : " There seem to be some slight signs abroad that the people of Bristol are beginning to shake off some of that lethargy in the matter of science, literature, and the arts which has been so conspicuous for the last half century, and to feel some care for things beside trade, commerce, and politics ; and in producing this most desirable change the University College and Medical School must be allowed to have had a considerable share, and will, I hope, receive a corresponding reward in their future progress." As we view to-day the munificent benefactions of your merchant princes, and in particular those of the Wills family, we may truly claim that Mr. Prichard's faith has been lost in sight and his hope in abundant fruition.

Evolution, whether social or scientific, will not be denied its advances, and whilst for long periods it may be unseen to all but a few discerning souls, it has a way of developing a phase of full and dominant expression. In no sphere of thought and work has this been more exemplified than, during the past half century, in the art and science of medicine.

The measures of medicine have been filled to overflowing by the contributions of our own workers and those of the sister arts and sciences. New facts and new settings of truths long known have been submitted for transmuting into agencies for the prevention, alleviation and cure of disease. The mass of knowledge has grown so great that the curriculum for our students, though much extended in time, still

remains congested. In practice this has become expressed in the divisions and sub-divisions of specialism, so that it is sometimes said that the specialist gets to know more and more about less and less and the general practitioner less and less about more and more. Accumulated knowledge, no doubt, supplies the *vis a tergo* in the creation of new departments of practice, but there is also a powerful *vis a fronte* in the public demand for specialist treatment. In the existence of a rising market for such services one of the dangers is the ready-made or even the reach-me-down specialist — the outcome of something like mass production out of a hasty curriculum in which a student may as early as his second year declare his suit as a prospective specialist and thereupon cause his subsequent training—largely theoretical—to be correspondingly focused, much to the detriment of that fundamental principle that all sound and justifiable specialism must be based on a thorough general training.

The General Medical Council has done much to prevent any marked degree of such untoward developments in this country, but I have personally observed them in important medical centres in other lands, where they are so rife as to cause grave concern to some of their directors. We have, in our own country, a more rational reaction to the call for the harnessing of new agencies for the diagnosis and treatment of disease, in the shape of team work in general practice, in consulting practice and in institutional service. In its optimum form this is conducted by well-trained and experienced practitioners and researchers.

The articles and correspondence columns of our medical journals reveal divergence of opinion as to whether the clinically-minded man and the laboratory-minded man can work in effective unison, or whether, in the alternative, we must await the evolution of a new order of men so gifted and ordained as to be capable of putting on more than a little both ways. Some of us know amongst our research colleagues men for whose abilities and personalities we have the highest regard who would be as much at sea in a hospital ward as we should be amid the tangle and equipment of their laboratories.

Of our liaison colleague, the pathologist, we know much. He is, so to speak, one of us, and is quite often indispensable in matters of clinical diagnosis. We are familiar, too, with his demeanour of benevolent reproach when we attend, shall we say, an occasional *sectio cadaveris* to have our shortcomings pointed out to us. But what about our more recent colleague, the bio-chemist, to whose hands it would seem is entrusted the great objective of revealing the utterly complex factors which constitute, and the conditions which vary resistance to disease and the various infections? As clinicians we do not know so much of him, but now that he has been summoned from the empyrean to deal with our earth-bound spirits, we confidently hope both to know and to appreciate him, and to introduce him to our patients, if such be his desire. Can our bacteriologists get much farther without some such revelation as that referred to, or will they, without waiting upon the bio-chemist, break through into the unknown themselves and get on with the business? If so, let them be assured the clinical hosts will

follow them hot-foot, and help to at least widen the breach.

Meanwhile, taking the case of septic infection, for example, the clinicians are "milling around" in a space from which there seems, for the time being, to be no escape. And the bacteriologists, to keep us moderately quiet, in the absence of further discoveries, keep on splitting up the streptococci into an ever-increasing number of groups with about as much affinity as exists, for example, between North and South Wales, or between Lancashire and Yorkshire, or even Devon and Cornwall. In our patience we will do our best to possess our souls.

If so much may be submitted regarding the trend of scientific evolution as it affects us, what may be said of the evolution of the legislative frame-work set up by the State during the past twenty years, and in which the profession is required to discharge its duties to the public ?

I suppose that, with one possible exception, there is no other country in the world in which, rightly understood, so much has been done in this direction, and, if I read aright the portents of recent legislation, in which so much more is being and will be done. Presumably it is the relative compactness of the British Isles and the density of their population—two factors which are at once our strength and, in some respects, our weakness—which largely account for this priority of administrative evolution.

The re-alignment of the conditions of general practice brought about by the Health Insurance Acts —a vivid memory to some of us—amounted to something of the nature of a revolution ; bloodless,

it is true, but sufficiently disturbing at that. A majority opinion will acclaim those Acts, after eighteen years' experience of their operation, as on the whole successful so far as they go, but equally it will be conceded that they cannot be regarded as other than a veritable torso in relation to a full-bodied National Health Scheme. Fuller developments are, of course, inevitable, and some of them of comparatively minor importance are already available in the form of additional benefits granted by certain of the Approved Societies, but the future has yet to determine the precedence of fundamental additions, such as (*a*) consultant and specialist services, (*b*) institutional treatment, or (*c*) the inclusion of the dependants of insured persons. The policeman's lot may not be a happy one, but it may be beatific as compared with that of the Chancellor of the Exchequer who is called upon to finance any or all of such developments.

But an enactment of the gravest importance to us as members of the medical profession, whether general practitioners or consultants, has arrived from another angle. Whilst our eyes may have been fixed in watchful regard on the movements of the Health Insurance Scheme, the Local Government Act, 1930, camouflaged in the wrappings of a de-rating scheme, has been placed on the statute book by the late Government. Had it been introduced by a Labour Government or — happy dream ! — by a Liberal Government, we might have been more concerned ; but there it is, and you in Bristol, in common with other centres, have been discussing methods of adjustment to a measure which in its scope and in its effect on all branches of the profession is likely

to prove a more profound revolution than even the Insurance Acts.

The sections of the Act which concern us principally are those which impose on the local authorities the duty of making institutional provision for the sick within their boundaries; and under Section 13 in particular, before deciding as to the kind and amount of accommodation required to meet their obligations under the Act, they must consult duly accredited representatives of the voluntary hospitals in their areas. An important consideration is that what has been termed the "taint" of being treated in Poor Law hospitals has been removed, and irrespective of class or category the doors of the hospitals under municipal control are open to all who need the treatment which these hospitals can provide—subject to the recovery of actual *per capita* cost—if necessary by legal process —from those whose financial position can so afford. This proviso at once raises the question of the economic status of the patients in our voluntary hospitals and the consequential difficulties of transfer from a voluntary to a municipal hospital and vice versa. It is obvious, of course, that in any valid scheme of co-operation between the two classes of hospitals facilities for transfer must be provided.

This difficulty is especially exemplified in the case of a patient coming into a voluntary hospital under the unwritten but admitted obligations of one of the group contributions by workmen, which are now so important a factor in the income of the voluntary hospitals. If such a patient be, for any reason, transferred to a municipal hospital (other than an infectious diseases hospital) he incurs the cost of his

maintenance therein subject to his proved ability to pay—whereas whilst he was in the voluntary hospital he is exempt from payment of any kind or from any inquiry as to his means. It is clear that difficulty with the group contributors will arise, not to mention that of obtaining the consent of the patient to the transfer. The *per contra* case of transfer from municipal hospital to voluntary hospital of a patient for whom the local authority accepts responsibility will involve payment of consolidated charges, including the cost of maintenance plus a sum which would go to a medical staff fund in accordance with a principle now generally approved. Personally, I do not think that much help can be expected from the establishment of district hospital benefit insurance societies such as have been proposed. To be adequate the premiums would have to be substantial, and neither the local authorities nor the voluntary hospitals would be willing to bear the insurance risk.

For some such reasons as the foregoing, as well as other considerations, it is likely that for some time to come the degree of direct co-operation between the State and the voluntary hospitals will not be great. The grade of treatment in comparable institutions and what is called "the atmosphere" of voluntary hospitals will continue to maintain their popularity, but a very important further attraction to the patients is the low cost—the bulk of them pay little or nothing —and where a large hospital receives a few pence or a few shillings per week from other than ticket or group-contribution patients it does not amount to much. Just how long is this minimal cost to the patients in the typical voluntary hospitals to continue ?

Some will answer, just so long as the legacies, annual subscriptions, special donations and group contributions collectively remain sufficient for the purpose. This is true, but not the whole truth. Incidentally, I think that the group contributions will increase, whilst legacies and individual annual contributions will tend to decrease. But in my judgment a more important determining factor is the unpaid services of the honorary staff. I am very far from even suggesting that the question of the substitution of a salaried service should now be raised. Nothing could be more inopportune. But if and when, owing to the utilization of municipal hospitals, the services of the honorary staff of the voluntary hospitals cease to have their counterpart in private practice a new position will have arisen. Personally I think that epoch is far from imminent, and that those hospitals will be, in any re-arrangement, the more favourably placed which are connected with medical schools.

I am certain that the importance of a large voluntary hospital as a financial mainstay in a commercial centre is not sufficiently realized. Taking the annual value of the worker to the community as so much, the extent to which he and his comrades are treated in such a hospital and returned to work represents to the community a sum equal to the whole income of the hospital manifolded. In other words, the community as a whole invests in the hospital as a going concern a sum equal to the hospital income and receives back yearly in the shape of restored workers the equivalent in money value of a large multiple of that income. An astonishing statement—but capable of actuarial confirmation. Imagine, then, the financial

chaos of the city of Bristol were its two great hospitals to close their doors.

In this connection it is readily computed that on a moderate estimate the market value of services rendered by the honorary staff of a general hospital of, say, 350 beds is about £350,000 to £400,000 per annum. I am not submitting that in the alternative that sum divided by the number of the members of the honorary staff would represent their annual incomes. But I do say that herein is the great factor of invisible income upon which, in a given community, the outstanding financial status of the voluntary hospital is based. So long as this remains constant it will be to the economic advantage of employers and workers to continue and, as occasion requires, to increase their contributions. Local authorities, too, will I believe continue, under prevailing conditions, to make those block grants which have in later years become almost general, rather than embark upon schemes involving costly outlay in structure and salaried service. On this latter point, however, much will depend, in different areas, upon the extent to which commitments have already been incurred.

A financial consideration of some importance to our voluntary hospitals is that in other countries, notably in Canada and the United States, much more than in the British Isles, the addition of a wing for private patients has proved to be a sound and even a lucrative investment for the hospital funds, and there is a growing body of opinion that such a development in our midst is overdue. Well-conducted and well-equipped nursing homes and private hospitals would

withstand the competition. Others—and there are too many of such—would not.

I am convinced that there is a possibility that the municipal authorities in certain districts may be first in the field.

In my belief, recent legislation notwithstanding, the days of our voluntary hospitals in their priceless services to the community, including medical education and research, are not numbered. Rather is it essential that they shall continue to flourish, and to preserve that sanity of outlook and enterprise which, as some of us know from personal observation in other lands, has endeared and ennobled them in the view of our colleagues the world over.

Some of the points I have dealt with—though all too scantily—Mr. President, are unquestionably of deep interest to all of us. So much so that in order to give myself the advantage of knowing the views of members present I am tempted to beg you to depart from precedent and to allow some general discussion to follow.

Once again, sir, may I express my warm thanks for the honour of being invited to address the Society.

THE MODERN OUTLOOK ON MENTAL HEALTH.*

BY

L. G. BROCK, C.B.,

Chairman of the Board of Control.

THERE are few questions of public health which are more in need of frank discussion than the question of mental health. How important this question is you will realize when I tell you that there are more than 120,000 patients under care in our mental hospitals in England and Wales, and it is estimated that in addition there are 300,000 mental defectives, of whom roughly one-third need institutional care.

At the outset I want to remind you of the distinction between mental disease and mental deficiency. This distinction has long been recognized in English law, and as far back as the reign of Edward I we find the statute (*De praerogativa regis*) enacting that "The King shall have the custody of the lands of natural fools." The same statute enacts that:—

> "The King shall provide when any that beforetime hath had his wit and memory happen to fail of his wit, as there are many that have lucid intervals, that their lands and tenements shall be safely kept without waste and destruction."

* An address given at Bristol University on Thursday, 12th March, 1931, to a meeting under the auspices of the National Council of Women.

The difference between the mental defective, the natural fool, and the person suffering from mental disorder could not be better put. Perhaps I ought to apologize for having, of necessity, to say much that will be familiar to many who are present here this evening. For the sake of clearness and completeness I am bound to emphasize what to some of you must be elementary distinctions. But these distinctions are, after all, fundamental, because they affect the kind of provision which the community has to make. Speaking broadly, mental disease calls for treatment and mental deficiency for custodial care and training. Disease may be remedied; defect, at any rate in the present state of our knowledge, is permanent.

Dealing first with mental disease, the main statute is the Lunacy Act of 1890. That Act had three main objects: to protect the community from persons unfit to be at large; to protect the patient from maltreatment and improper detention; and to protect the patient's property. The test of liability to detention is behaviour. The point is important because there is a good deal of misunderstanding about it. Nobody is detained in a mental hospital because of his opinions, however misguided they may be. Political life would indeed be dangerous if it were otherwise. Delusions do not matter until they affect the patient's conduct. The crucial question is whether the patient is dangerous to himself or to others. I want to emphasize, too, that the operative document is the reception order which is made by a judicial authority. There are medical certificates, but the effective instrument is the document signed, not by a doctor, but by a magistrate. The Act of 1890 was primarily concerned with custodial care.

It does, indeed, recognize the possibility that the patient may recover, but it takes little account of remedial treatment. You can read the Act from beginning to end—and it is a very long one—without realizing that it deals with sick people in need of medical treatment.

The Act of 1890 remained in force without substantial amendment for forty years, until the passing of the Mental Treatment Act last year. That Act made several most important changes. First of all, it empowered local authorities to provide out-patient clinics. This marks the beginning of an effort to treat mental disorder on preventive lines. Secondly, it provides for the admission of voluntary patients to public mental hospitals, and so gives everybody, whatever his means, a privilege which hitherto had been the monopoly of the well-to-do. In the third place, it recognizes an entirely new class of patient, the temporary patient dealt with under Section 5. This Section provides for treatment in certain cases solely on medical recommendation and without the intervention of any judicial authority. It is, in fact, the first attempt to assimilate the treatment of physical and mental disorders. It is a statutory recognition of the fact that mental disease is like physical disease, a condition which calls for medical care, which may be and ought to be treated, the necessity for treatment being determined by doctors and not by lawyers. Treatment as a temporary patient is limited to non-volitional cases, that is to say, patients who are unable either to consent or to refuse. The practical effect of this provision is to obviate the need for certification in many confusional, toxic and puerperal cases of relatively short duration. The woman who has a short period of mental

disturbance after child-birth or the man who breaks down for a time after influenza can in the future escape the stigma of certification.

It is most important that medical men should recognize the new opportunities which the Act gives them. Parliament in the past has sometimes been distrustful of doctors, but in the Mental Treatment Act it trusts them as they have never been trusted before in our lifetime. I hope they will justify this confidence, and so pave the way for the complete disappearance of the judicial authority so far as early cases are concerned. Doctors, if I may be allowed to say so, are timid of responsibility, and I admit that recent cases in the courts have afforded some justification for this. But we have tried to meet their difficulties by giving them additional protection against vexatious and unwarrantable legal proceedings, and I hope the general practitioners will face their responsibilities, and will not try to pass them on to others.

Now I come to the place of the voluntary and municipal hospital in the treatment of mental disorder. One of the biggest changes made by the Mental Treatment Act is to associate these hospitals in the treatment of mental disorder. They can co-operate in three ways: by providing out-patient clinics; by admitting voluntary patients; and by admitting temporary patients. The out-patient clinic is simple, especially if the social work can be done by voluntary organizations. All that is needed is a consulting-room and a share of a waiting-room. There are many advantages in treating a clinic as part of the general out-patient department. Patients can go there without exciting curiosity. It is most important that they should be free to seek advice

without provoking embarrassing questions from their neighbours. Many other patients will be referred to the clinic by the medical staff of the hospital. I want to see the senior staffs of the mental hospitals co-operating in these clinics, and they should be appointed on the honorary staff of the voluntary hospital. In return, the staff of the voluntary hospital should become consultants at the mental hospital. I am convinced that this closer association will be good both for the doctors and the patients, particularly as many of the patients are physically as well as mentally sick. But the out-patient clinic will soon reveal cases which the physician will want to keep for a more complete examination. I doubt if any clinic can be regarded as really complete unless it is supplemented by a few observation beds. This has been the experience in Oxford and in a few other centres where out-patient clinics were opened before the passing of the Mental Treatment Act. Observation beds are valuable, but by themselves they are not sufficient. We need, in particular, to provide for the admission as voluntary patients of those persons whose mental disorder is complicated by physical conditions which require more resources in men and equipment than a mental hospital may be expected to provide.

So far I have spoken of voluntary patients, many of whom could be nursed in an ordinary ward by general-trained nurses. But there will be cases, particularly toxic cases, who will be too confused to be able to consent to treatment, and can therefore only come in as temporary patients. These will need nurses specially trained in mental nursing, and the number of hospitals able to provide for them will necessarily be limited. But it seems desirable that

teaching hospitals, at any rate, should make some provision for temporary patients, for the sake of the student. The great majority of medical students will go into general practice, and every doctor in general practice has, sooner or later, to deal with incipient mental disorder. It is vitally important that he should learn to recognize it early, yet it is admitted that at present the opportunities of clinical study are lamentably inadequate. For this reason I am convinced that mental wards would have special value in teaching hospitals.

But closer association between psychological and general medicine has other advantages besides its value from the point of view of medical education. Psychological medicine has far too long been kept, as it were, in a watertight compartment, and anything which helps to break down the barrier between psychological and general medicine is a clear gain. In particular, we need more study of the relation between physical and mental disorders, and there can be little doubt but that research in this direction would throw light on the causation of mental disorders.

All this may have suggested to you that under the new Act the treatment of early cases is to be concentrated in the voluntary hospitals. This is far from being the case. The majority of cases will continue, and rightly continue, to be treated in public mental hospitals. But if they are to have a fair chance, our public mental hospitals must be properly equipped for active treatment on modern scientific lines. To this end it is most important that every mental hospital should have a separate admission unit and treatment centre, supplemented by convalescent villas. Now how does Bristol stand ?

You are in a position of special difficulty. Your present hospital at Fishponds is, for the most part, an old building, and the amount of land available is so restricted that it is practically impossible to modernize it. The City Council, recognizing this, have secured a site for a new institution at Barrow Gurney. This is a development of the greatest value, because it will give an opportunity of providing the treatment unit and the therapeutic resources which you cannot at present provide at Fishponds. But it will be essential to maintain close relations between the two institutions, and to make them, as it were, dovetail into one another.

If these ideals are to be realized you will need to educate public opinion. Even the most progressive local authorities need the support of enlightened public opinion, and an organization such as the National Council of Women can do a great deal to bring home to people the need for organizing the treatment of mental disorder on progressive lines. Of course, I know that these new developments mean expense, but I am convinced that in the long run they mean economy. After all, nothing is more expensive than to turn a curable case into a hopeless chronic whom you will have to maintain for the rest of his life—which may be, and often is, a very long one. There are some kinds of economy which are positively criminal.

People often ask, What is the good of all this expenditure ? They admit that patients recover, but they ask whether there are really any cures. I agree that some patients recover in spite of their doctor. That is true in all branches of medicine. But it is sheer blank fatalism to argue that because there are unexplained recoveries, and often unaccountable

failures, that there is no need for modern therapeutic equipment. If you ask whether there are any cures, I would instance the treatment of general paralysis of the insane. That is a disease which accounts for about 10 per cent. of male admissions and 6 per cent. of female admissions into our mental hospitals. Up till a few years ago, though there were sometimes temporary remissions, general paralysis of the insane meant death in the course of two, three or four years. Now, thanks to the treatment by induced malaria, there are many men and women back at work and leading useful lives who but for this would long ago have died miserably. I do not say that there is a complete cure. No one can repair damage already done, any more than you can repair a damaged heart. But what you can do is to arrest this disease and, in many instances, send the patient back into the world.

Even if I were doubtful about the therapeutic value of this treatment or that, I should still feel justified in trying it for the sake of the psychological effect on the patient. Nothing is quite so fatal as to make the patient or his friends feel that nothing can be done. There is no use in medicine for the pessimist. The doctor who does not believe in himself will never make his patients believe in him, and the doctor who feels that he can do the patient no good generally turns out to be a true prophet. I have had twenty years' close association with doctors, and I still believe, more than I ever did, in the possibilities of medicine. By "medicine" I do not mean drugs, I mean the whole art and science of medicine. Miracles do happen; I have seen them. But they only happen to the people who deserve them and work for them. The recovery rate is not as good as it ought to be; it

is not as good as it is going to be. It can be improved, and it must be improved. But the average recovery rate of 30 per cent. of admissions compares favourably with the results in the medical wards of general hospitals. We are apt to forget how the recovery rate in general hospitals is inflated by the inclusion of large numbers of comparatively straightforward surgical cases. After all, the chance of recovery from mental disorders is far better than the chance of recovery from heart disease, cancer or disseminated sclerosis.

Now I turn to the other side of the picture—mental defect. Here we are up against a really appalling social problem. According to the investigation carried out by Dr. Lewis there are 300,000 defectives in England and Wales, of whom at least a third ought to be receiving institutional care. People sometimes ask me why we hear so much about mental deficiency now while so little was heard of it a generation ago. The real answer is that mental defect is not a new problem. What is new is the diagnosis, or rather the recognition of the need for making some provision for this most unfortunate class. It was the Royal Commission of 1904 which first focused attention on the fact that much destitution and not a little crime was due to subnormal mentality. It was the report of this Commission which led to the passing of the Mental Deficiency Act of 1913. The low-grade defective had long been recognized. You cannot overlook the idiot and the imbecile. What had not been recognized was the existence of a much larger mass of people who are the victims of arrested mental development and differing from inbeciles only in degree. Physiologically all defectives have the common feature that the brain

is not completely developed. The condition is often inherited, or at any rate innate, but it may be due to injury at birth or in early life or to disease such as encephalitis lethargica. Psychologists tell us that the last part of the brain to develop is that which controls conduct. Hence defectives, irrespective of age, behave like children. They are impulsive, unstable, incapable of sustained effort or self-control. They may be cruel, vicious or erotic. But it is unfair to use language implying moral judgments. Defectives are not responsible for their actions, and they are amoral or, if you prefer the term, unmoral rather than immoral.

Modern social organization is very complex, and it demands a degree of self-control of which the defective is altogether incapable. In a sense, the higher grade defectives may be said to be the victims of civilization. In a more rudimentary society they would rub along without great difficulty, but they cannot submit to the restrictions which are inevitable in a more complex society. The real test of defect is social adaptability. I want to stress that point, because there is a very general, and entirely wrong, impression that people are classed as mental defectives and often segregated because they cannot reach some prescribed educational standard. What are called "intelligence tests" are used, and are, indeed, most valuable for the purpose of measuring the degree of defect. But educational failure is not conclusive evidence. No one is segregated for failing to pass some educational standard; and some defectives, particularly the moral defective, may be up to or even a little above the average intelligence as measured by intelligence tests. The real test is whether people can adapt themselves to social conditions.

"Social adaptability" is a very useful abstract phrase, but, like all abstract phrases in general use, it tends to become a kind of "shorthand," and to be used without any very definite meaning being attached to it. What does it mean in actual practice as applied to the individual case? I think the best answer is to ask another question. Where would the defectives be if no provision were made for them? Some would be in prison, often for silly, purposeless crimes. Rick-firing, for example, is four times out of five the work of defectives. It is very typical of the sort of thing which defectives do. Window slashing is another instance. You may remember that some time ago there was an epidemic of window smashing in London and elsewhere. I speak without authority, but my recollection is that, judging from the press reports, almost every one of the persons convicted of these offences exhibited some signs of mental defect. Then there will be many cases of sexual offences. I do not mean that all sexual offences are due to defect, but a great many certainly are. Many other defectives will be in workhouses. They form the great majority of the chronic unemployable. Many of the women will be prostitutes, drifting from the brothel to the workhouse and from the workhouse back to the brothel. Many will be spreading dirt and disease through sheer incapability of observing even the elementary laws of hygiene.

Now the low-grade defectives, idiots and imbeciles, occur at all social levels, but the high-grade defectives are mainly the product of 10 per cent. of the population. In my younger days we used to hear a great deal about the problem of "the submerged tenth." I think we are coming now to recognize that the real problem is the problem of the *subnormal* tenth, and it

is more and more evident that the slum is to a large extent the creation of the slum mind and not merely the automatic result of a bad environment.

The National Council of Women is a practical body. You want to get things done, and you will naturally ask: What can be done for the defectives? About two-thirds can be dealt with by supervision or guardianship, but, as I have said, the remaining one-third require some institutional provision. The best way of providing for the young and trainable case is unquestionably the colony. Adapted Poor Law buildings will provide adequately for the older and unemployable cases. The great value of the colony is that it gives the defective an opportunity of enjoying community life. Many of them can be partly self-supporting. A well-organized colony will not only do its own washing, cooking and housework; it will do its own carpentry, bootmaking, dressmaking, weaving and market gardening. When I am asked whether, in these hard times, we can afford colonies, I am tempted to rejoin by asking whether we can afford to leave the defectives at large. The total cost to the community of mental defect cannot be calculated, because it cannot be separated from the general cost of maintaining prisons, hospitals and workhouses, but if you could calculate the cost separately the figure would be truly appalling. And so, if you ask whether we can afford colonies, I would say: "Can we afford to do without them?" Quite apart from the merely economic aspect of the question, if society, for its own convenience, restricts the liberty of some of its members, is there not a social obligation to make life tolerable for those who are segregated not merely for their own protection but also for the convenience of others?

What is Bristol doing in this matter? You have provided, and will soon be opening, a very fine new colony at Hortham; but you are also, I am sorry to add, accommodating many of your defectives, including children, at Stapleton, where I have seen quite young children being housed and taught in buildings which were erected for the accommodation of French prisoners in the Napoleonic Wars. But in addition to provision made by the Council, Bristol has an honourable place in the treatment of mental defect because of the pioneer work carried out at Stoke Park Colony.

What can the National Council of Women do for mental defect? There is one special sphere of work open to women, and that is social service, both in relation to the out-patient clinic and to after care. We need a nucleus of highly-trained women for this purpose, but there is also room for the voluntary worker, though the voluntary worker is also none the worse for training if she can afford to take it. It is work which requires tact and patience, but it is vital to the success both of the out-patient and after care departments. Much the same type of worker is needed to assist in the ascertainment and supervision of those mental defectives who do not require institutional care. I know there is a tendency to leave all work of this kind to paid experts, but I should be sorry if this became general. The voluntary worker may not be so highly trained, but the voluntary spirit is worth preserving. The Mental Treatment Act gives local authorities power to contribute to Voluntary Associations. I hope you will see to it that in Bristol there is a local organization ready and capable of meeting the need. The work is not easy, but it is immensely worth doing.

But this is, after all, a very limited work, and only a few of you have the time to take it up. There is a much more important task in which you can all share, and that is to create a healthy public opinion. There is still far too much of the Victorian policy of concealing mental disorder. This "hush-hush" habit is simply fatal. There are three main objectives which we want to keep before us. First of all, early treatment; next, intensive treatment; and lastly, research. Early treatment is impossible unless we can secure the confidence of the patient and the family doctor. Incalculable harm is done by delaying treatment until concealment is no longer possible. Intensive treatment means that mental hospitals must be adequately staffed and equipped with everything which medical science can devise. Bristol is fortunate, if he will allow me to say so, in its Medical Superintendent, and I hope that you will see that Dr. Barton White is given everything which he needs.

Research, to be effective, demands the co-operation of the University and the Medical School. Research in this sense means team work. It is not, as people are still apt to think, all done by an absent-minded genius breeding microbes in a test-tube. Laboratory work is essential, but it is not the whole of research. The Mental Treatment Act gives local authorities power to contribute to research, and I hope that you will see to it that this power is exercised.

The provisions of the new Act are mainly permissive, and local authorities will need the stimulus of public opinion. Bristol has in this matter a great opportunity. You have a University, a Medical School, and two great teaching hospitals. You have an abundance of clinical material for the study of

mental disorder and defect of all kinds. I am very glad that a beginning has now been made at Stoke Park, and the scheme which has been undertaken there does credit to the breadth of outlook of the Administrator and Professor Berry and to the pioneer work of my old friend, the late Dr. Branthwaite.

But there is another way in which the University can help. We want more postgraduate training in psychological medicine, and there is special need of men to devote themselves to mental deficiency work. With the multiplication of colonies there will be many posts to be filled in the near future. Present students would do well to consider the possibilities which this branch of medicine offers. I do not suggest that any doctor worthy of that name takes up a particular branch of medicine merely for the sake of the money it will bring to him; but at the same time it is idle to ignore this aspect, and I am sure that many students do not realize the opportunities of fascinating work coupled with a decent living which this branch of medical administration offers.

I have called this talk "The Modern Outlook on Mental Health." I called it that partly because I was told that it must have some title, but I think the phrase does express the spirit of what I have tried to put before you. The modern outlook on mental health is essentially hopeful. I do not mean that there is any sloppy optimism about it or an indolent waiting for something to turn up or for somebody else to do something. I mean by hope a firm, reasoned faith that the concentration of effort and of all available resources will one day solve what is one of the gravest health problems of our time. Do not look for sensational results. Years of effort, of patient labour and many disappointments will

have to be faced, but for the future of our race this problem must be tackled. We cannot afford to fail, and I hope and believe that in this great task Bristol, with its University, its Medical School and great teaching hospitals, will play a worthy part.

SOME INTESTINAL MALFORMATIONS AND THEIR CLINICAL SIGNIFICANCE.*

BY

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TISSUE malformations of the intestinal tract have hitherto been regarded as of rare occurrence and of negligible clinical importance, and their systematic study has been considerably neglected, at any rate in this country. From the various types of malformation encountered from time to time there emerges one well-defined group in which the epithelial structures of the bowel wall are alone involved. Here the malformation consists in a misplacement or *heterotopia* of epithelium, and it is with this group that the present paper is concerned.

That the condition of epithelial heterotopia is by no means rare is shown by the fact that, during a two years' investigation, no fewer than eighty-seven personal cases have been collected, of which the great majority actually occurred during the period of study. Moreover, while admittedly a large proportion of the cases represent accidental post-mortem findings and appear to have been symptomless during life, many of them have been productive of mischief and indeed

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some have been responsible for serious and even fatal abdominal lesions. It is clear, therefore, that the subject is of more than purely academic interest, and it is the purpose of this paper to indicate the nature and origin of these heterotopic conditions, at the same time emphasizing more particularly the type of case in which the heterotopia has proved to be of definite clinical importance.

It is necessary at the outset to emphasize certain anatomical features of the alimentary tract in so far as they bear upon the question of epithelial heterotopia. In the first place attention is called to the wide variation in the epithelial types normally met with in different regions. Epithelium from the œsophagus, from the cardiac, fundal and pyloric regions of the stomach, and from the intestine has each its own peculiar histological characters which immediately determine its site of origin. The transition from one type to another is generally quite abrupt, and coincides with the sphincters separating the different portions of the gut where such exist. There may, however, occur in a given region islets of epithelium which are foreign to that region, but which are typical of some other portion of the intestine. So, for example, we may find gastric glands high in the œsophagus or typical intestinal villi in the fundus of the stomach. Such misplacements of tissue have been named the *superficial* heterotopias, since the process is merely one of substitution in the epithelial lining of the gut and involves the deeper layers not at all.

Secondly, the epithelial structures of the alimentary tract are, with two exceptions, confined strictly to the inner side of the muscularis mucosæ, a fine muscular tube present throughout the gut from the œsophagus

downward. These two exceptions are provided by the mucous glands of the œsophagus and the Brünner's glands of the duodenum, both of which lie normally in the submucosa. Otherwise, whenever glandular structures are present beneath the muscular boundary, we have to deal with a *deep* heterotopia. The process in this case is one of penetration.

Whether produced by a process of substitution in the epithelial layer or by penetration through the muscularis mucosæ which forms its deep boundary, epithelial heterotopia may make its appearance either in embryonic life when the intestinal epithelium is actively growing, or after birth following local destruction of tissue by inflammatory (ulcerative) processes. Heterotopias, therefore, readily fall into one of two main groups, those of congenital origin and those of acquired origin. For the purpose of the present discussion the latter group may be safely ignored; the acquired heterotopias are invariably of microscopic dimensions, consisting merely of a few cell-islets snared off from the mucous membrane during the reparative process, and quite incapable of harm to the subject. Attention is therefore to be focused on the congenital heterotopias, which group provides all the clinically important cases of the series.

The congenital heterotopias would appear to be confined almost without exception to the upper portion of the alimentary tract. The only exception that has been found to this rule is a case reported by Trappe (1907), who described an adenomyoma of the large intestine in a five months old infant. The present series includes eighty-seven cases, all of which occurred above the level of the ileo-cæcal valve. Their relative

frequency and disposition will be seen from the following table :—

Region affected.	Type of Misplaced Tissue.	No. of Cases.
1. Œsophagus	Superficial (gastric)	6
2. Stomach	(*a*) Superficial (intestinal)	36
	,, (duodenal)	1
	,, (mucosal diaphragm)	1
	(*b*) Deep (submucous glands)	1
	,, (intra-mural cyst) ..	1
	,, (adenomyoma ..	6
	,, (accessory pancreas)	6
3. Duodenum	(*a*) Superficial (gastric)	2
	(*b*) Deep (adenomyoma) ..	4
	,, (accessory pancreas)	8
4. Small Intestine ..	(*a*) Superficial (gastric)	1
	(*b*) Deep (accessory pancreas)	3
5. Meckel's Diverticulum	(*a*) Superficial (gastric)	7*
	(*b*) Deep (accessory pancreas)	3
6. Umbilicus	Superficial (gastric)	1
	,, (intestinal) ..	3
	Total	87

It will be noted that, in addition to this strict localization to the upper portion of the intestinal tract, the majority of the deep heterotopias consist wholly or in part of pancreatic tissue, and it is perhaps not irrelevant at this point to mention briefly what is known of their mode of origin. In the early embryo the entoderm of the primitive digestive tube is destined to give rise to a great variety of epithelial structures. The stratified squamous epithelium of the œsophagus, the widely-differing glandular elements of the stomach, duodenum and small intestine as well as

* Includes three cases in which heterotopic pancreas was also present.

of the liver and pancreas—all these arise from cells which at an early stage are morphologically identical. Heterotopias are to be regarded as the result of some slight error of development, whereby in restricted areas cell-differentiation pursues an abnormal course. The precise mechanism of their production is still a matter of conjecture. It is a fact that many heterotopias of both deep and superficial varieties are associated with congenital diverticula, and in many of the deep cases a communication can be demonstrated between the aberrant glands and the free surface. When it is remembered that the pancreas itself is developed from an intestinal diverticulum, it seems reasonable to suppose that the heterotopias under discussion have a similar origin in diverticula of the fœtal entoderm. Such diverticula have been frequently observed. They are described independently by Keibel (1905) and Lewis and Thyng (1908), who found them in the foregut of numerous early mammalian embryos, scattered in the antimesenteric wall. I have myself seen them in early human and sheep embryos, and I have been impressed, moreover, by the extreme proliferative activity of the fœtal entoderm, which at this early period is thrown into numerous folds which at places may nearly obliterate the lumen of the foregut. The majority of these diverticula later tend to be absorbed in the general epithelial layer, but some of the deeper ones persist, and in their abnormal situation beneath the muscularis mucosæ would appear to provide a likely source of epithelial heterotopia. It is significant that the diverticula are not evident in the hindgut, but are confined to the foregut, where in their antimesenteric distribution they correspond closely with accessory pancreas and its allied conditions.

1. HETEROTOPIA IN THE ŒSOPHAGUS.

The Upper Cardiac Glands.—This name is given to small islets of glandular tissue resembling gastric glands which are found in the œsophagus near its upper end. Microscopic examples of the condition are very common, and were found by Schridde (1904) in 70 per cent. of all bodies examined. Cases readily distinguishable by the naked eye are comparatively rare, and only six were found in a consecutive series of 900 post-mortem examinations. Typically they are met with as irregular elongated patches with a smooth pink or reddish surface slightly depressed below the level of the œsophageal epithelium, their margins being somewhat raised and presenting a whitish, sodden appearance. (Fig. 1.) They closely simulate shallow ulcers, and may readily be mistaken for them. They are frequently bilateral, but are then usually unequal in size and situated at slightly different levels. Usually they are found in the posterior wall; five of my own six cases occurred in males and one in a female.

All the cases of heterotopic gastric mucosa were encountered by accident in the course of routine post-mortem examination. They had occasioned no symptoms during life, and appear to be devoid of clinical significance. These heterotopias consist merely of patches of gastric mucous membrane developed in an abnormal situation. Their cells possess fully adult characters, and show the same completeness of differentiation as is found in the stomach itself. That they actually secrete a gastric juice is very probable from the rapidity with which they undergo post-mortem digestion, yet such a secretion must be constantly neutralized by the swallowed saliva, and

it is extremely unlikely to cause damage to the resistant squamous epithelium adjacent. The wide variation found in the age of the subjects—the youngest being seven and the eldest seventy-four—indicates merely that the heterotopic tissue once formed persists indefinitely in an unchanged condition. Ulceration or inflammatory changes have not been seen in relation to these aberrant glands; nor is there any evidence that they play any rôle in the production of carcinoma. The majority of cancers of the œsophagus are of squamous type, and their site of election is in the region of the bifurcation of the trachea, where these islets of gastric mucosa do not occur.

2. HETEROTOPIA IN THE STOMACH.

(*a*) *Superficial Heterotopia.*—I have found heterotopic structures more frequently in the stomach than in any other portion of the alimentary canal. No fewer than fifty-two of the eighty-seven cases observed have been found in this organ, and of these thirty-six are of *intestinal gland* type. This undue preponderance may be in part accounted for by the fact that a large series of excised stomachs which had been submitted to microscopic examination was available for study. In a series of 158 stomachs removed at operation intestinal glands were found thirty-six times, *i.e.* in 23 per cent. of the cases. This heterotopia takes the form of isolated patches of typical intestinal villi scattered apparently at random in the gastric mucous membrane. These vary in extent from single glands to wide areas an inch or more across, and are present in the cardiac as well as in the fundal and pyloric portions of the stomach.

Microscopically the aberrant glands show an abrupt transition to normal gastric glands on either side.

Their histological characters are typical of normal intestinal villi and crypts of Lieberkühn, set on a well-developed muscularis mucosæ, beneath which the submucous and muscular coats show no abnormality. The adult character of the tissue is beyond doubt, and it is only reasonable to conclude that it was incorporated in the gastric mucous membrane during fœtal development.

The clinical aspects of this type of heterotopia are probably of little importance. It is significant that all the examples in the present series were discovered accidentally during routine examination of stomachs removed surgically for ulcer or cancer. Incapable in themselves of producing clinical symptoms, they have sometimes been regarded as predisposing factors in the production of these two conditions. The following observations afford some evidence against any such relationship :—

1. In only two of the thirty-six cases were the intestinal glands found at the edge of the ulcer. In the remainder they were some distance away from the crater, and here showed no inflammatory change whatever.

2. They are very frequently multiple ; chronic gastric ulcer and carcinoma are almost invariably single.

3. They occur in all regions of the stomach, while chronic ulcer is usually found in the middle third near the lesser curvature, and carcinoma in the pyloric region.

4. Their differentiation is as complete and their arrangement as orderly as that of the normal mucosa. There are no histological grounds for the belief that they are more prone to ulceration or cancerous

degeneration than any other portion of the stomach. Moreover, since primary carcinoma of the small intestine is very rare, it is unlikely to arise in epithelium of intestinal type, even though this is found in the stomach.

Duodenal gland heterotopia in the stomach in situations remote from the pylorus is excessively rare, and this condition has been observed only once in the series of 158 stomachs examined.

A female, aged 47, was admitted for acute perforation of a gastric ulcer, and at operation a small deep ulcer was found in the anterior wall of the stomach some four inches from the pylorus and close to the lesser curvature. There was a small perforation in its floor, with free gas and fluid in the abdominal cavity. No adhesions were present, showing that the ulcer had progressed unusually rapidly to perforation. Local excision. Good recovery.

Histologically the excised portion shows an ulcer of subacute type, situated in what appears to be typical duodenal wall, in which the Brünner's glands peculiar to the duodenum are reproduced down to the minutest detail; so much so, that a diagnosis of perforated *duodenal* ulcer was made without hesitation when the specimen was first examined.

The striking feature of this case is the apparent rapidity with which it has perforated. Having regard to its subacute character, it is difficult to believe that this ulcer alone has been responsible for the thirty years' history of gastric symptoms given by the patient. Although an isolated finding, it would tend to support the view of Audistère (1903), that ulcers occurring in heterotopic duodenal mucosa pursue a very rapid clinical course.

Mention has already been made of the exuberant growth of the fœtal entoderm, which may proliferate so rapidly as almost to obliterate the lumen of the primitive gut. Indeed, for a short time in early embryonic life that portion of the foregut which is

destined to form the pylorus and duodenum is converted into a solid tube, later regaining its patency as the digestive tube lengthens out during its growth. Occasionally the patency is not completely restored, and the excessive mucous membrane then persists as a more or less complete obstructive diaphragm.

A case of this type producing fatal obstruction was recently encountered at the General Hospital.

A female infant, six days old, had vomited all food since birth, and was admitted to hospital in a moribund condition, dying before surgical intervention could be attempted. At post-mortem the pyloric antrum was found to be completely obstructed by a stout diaphragm of mucous membrane stretched across it, completely shutting off stomach from duodenum. Microscopically the diaphragm is found to consist of a twofold layer of muscularis mucosæ, clothed on either side with an exuberant mucous membrane of pyloric glands which are continuous with those of the adjacent stomach wall. There was no pyloric stenosis and no other intestinal malformation was discovered, so that death was clearly attributable to the heterotopic diaphragm described.

(*b*) *Deep Heterotopia.*—When as a result of developmental error the embryonic epithelium comes to lie beneath the muscularis mucosæ the tissues resulting from its persistence or subsequent growth may be found occupying the deeper layers of the intestinal wall, or even presenting on the peritoneal aspect of the gut. They vary widely in extent from a few microscopic glands to tumours of considerable size which are visible and palpable on either or both surfaces of the bowel. A very close relationship exists between all these aberrant structures, which range from simple glands and heterotopic cysts to adult pancreatic tissue in whose complete differentiation not even the islets of Langerhans are lacking. The greatest interest attaches to the intermediate group of *adenomyomas*, which present a great diversity of structure, often

PLATE III

Fig. 2.
Adenomyoma of stomach. Slide drawing showing the hypertrophy of the pyloric musculature and the variety of epithelial structures, amongst which masses of pancreatic tissue are prominent.

PLATE IV

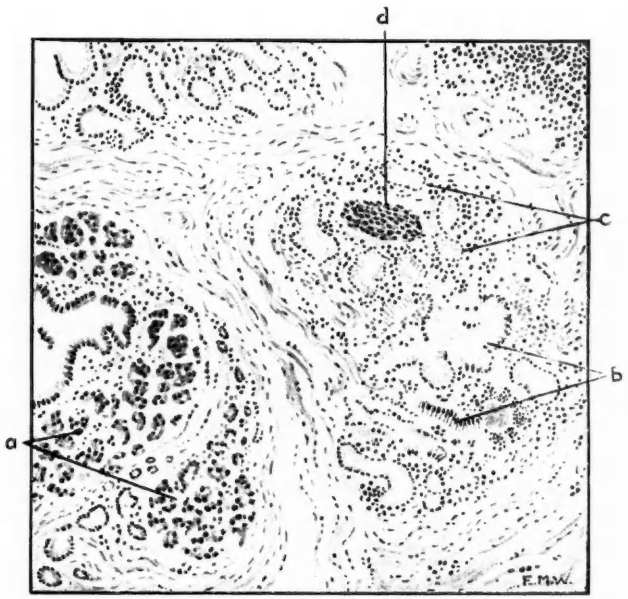

FIG. 3.

Adenomyoma of stomach. Low power view showing the diversity of cell structures present. (*a*) Adult pancreatic acini. (*b*) Undifferentiated duct epithelium. (*c*) Brünner-type acini. (*d*) Squamous fragment. The glandular elements are ensheathed by layers of unstriped muscle, which are an integral part of the tumour.

with a preponderance of undifferentiated tissue, in which distinct evidence of neoplastic activity is to be seen. Moreover, this type of heterotopia is capable of giving rise to gastric symptoms, and so attaches to itself a very definite clinical importance. Of the six gastric adenomyomas in the present series four caused symptoms for which the patient sought relief.

1. A man, aged 46, who had had gastric symptoms for sixteen years. At operation a hard round lump was found in the anterior wall of the stomach near the pylorus; this was excised, together with the appendix. On section the tumour was found to consist of small solid masses of pinkish colour, occupying the submucous coat and the superficial part of the considerably hypertrophied muscularis. (Fig. 2) Microscopically it showed a mixture of glandular tissues (Fig. 3), including well-formed pancreatic acini, glands of Brünner type, and undifferentiated duct-spaces of active appearance, many of them large enough to be visible to the naked eye.

2. A man, aged 55, had suffered for two years from severe attacks of epigastric pain, latterly with nausea. At operation a hard plaque fully half an inch in diameter was found in the thickness of the anterior wall of the stomach close to the pylorus. It was regarded as possibly malignant, and pylorectomy performed. The microscopic characters coincided with those of the previous case.

3. A man, aged 53, had suffered from intermittent attacks of dyspepsia for many years with loss of weight. At operation a diffuse nodular thickening was felt in the substance of the stomach wall on the greater curvature near the pylorus. Malignancy was suspected, and partial gastrectomy performed. Microscopically the thickened musculature was found to contain widely-scattered areas of glandular tissue of the same three types.

4. A woman, aged 25, who died from septicæmia following an abscess of the chest wall. For two years she had had indefinite epigastric pain for which she had received treatment, her doctor suspecting gastric ulcer. At post-mortem no ulcer or scar was found, but on the posterior wall of the stomach half an inch from the pylorus there was a firm, rounded nodule

nearly an inch in diameter. Microscopically the diagnosis of adenomyoma was confirmed. In the absence of any sign of present or past ulceration it seems clear that this was the cause of the gastric symptoms.

Although accessory pancreas is also of fairly common occurrence in the stomach, none of the six cases encountered was known to have produced symptoms during life. It is noteworthy in this connection that aberrant pancreatic nodules may occur in all other parts of the stomach wall, whereas adenomyoma is invariably met with at or very close to the pylorus. The suggestion appears reasonable that in this site the tumour is more likely to produce obstruction or muscular spasm, and so occasion symptoms. It is to be noted that adenomyoma is essentially a simple tumour; there is no evidence that it bears any relationship to gastric carcinoma (Nicholson, 1923), and adequate treatment consists in local excision rather than in extensive gastric resection.

3. HETEROTOPIA IN THE DUODENUM.

(*a*) *Superficial Heterotopia.*—Only two examples of this condition have been encountered in the present series. Both of them consisted of small plaques of *gastric glands* incorporated in the duodenal mucous membrane, and in one the aberrant glands were associated with a small congenital diverticulum. The condition is probably of no clinical interest, and merits no more than passing mention here.

(*b*) *Deep Heterotopia.* — In the duodenum both adenomyoma and accessory pancreas are relatively common, a fact which is not surprising in view of the close proximity of the main pancreatic gland. Twelve cases of the kind have been encountered. As a rule

they are of small size and devoid of symptoms, but as they are commonly found in the second part near the ampulla of Vater, they may possess harmful potentialities out of all proportion to their size. In one case occurring recently at the General Hospital a small adenomyoma was directly responsible for complete biliary obstruction and fatal jaundice.

A man, aged 63, had suffered from gradually increasing jaundice for six weeks, and when admitted to hospital was practically moribund, so that operation could not be attempted. At post-mortem there was no sign of gallstones or pancreatic carcinoma, but all the organs were deeply jaundiced, and the common bile duct was greatly distended. On careful dissection the cause of the obstruction was found at the ampulla of Vater itself, where there was a small nodule of firm tissue growing round the orifice of the duct and completely occluding its lumen. Microscopically the nodule was found to consist almost entirely of undifferentiated duct material, with a few scattered islets of pancreatic acini. There was an abundant stroma of smooth muscle fibres separating the glandular structures into well-defined lobules; the occlusion of the duct was clearly due to pressure on its walls by the enlarging heterotopic mass, and not to malignant infiltration.

4. HETEROTOPIA IN THE SMALL INTESTINE.

(*a*) *Superficial Heterotopia.* — Apart from that occurring in relation to Meckel's diverticulum, superficial heterotopia in the small intestine appears to be a rare condition, and Nicholson (1923) states that congenital gastric heterotopia has not been noted below the level of the duodenum except in the persistent remnants of the vitelline duct. Nevertheless, I have been fortunate enough to encounter one case occurring near the lower end of the ileum, associated with ulceration and fatal hæmorrhage.

A male child, aged 17 months, previously quite healthy, had a sudden attack of blood-stained diarrhœa. Two days later there was a copious intestinal hæmorrhage which

apparently came from high up in the intestine. The child recovered from this attack, but the stools continued to show traces of blood. Three subsequent large hæmorrhages occurred at intervals of a few weeks, and death took place in spite of blood transfusion four months after the onset of the illness. At post-mortem a tumour-like mass was found in the mesenteric border of the gut, and immediately below it the mesenteric glands were enlarged and inflamed. On opening the bowel the mucous membrane was found thick and prominent over an area as large as a two-shilling piece, and thrown into two or three large folds. At its junction with the normal mucosa there was an ulcerated area half an inch across, from which the fatal hæmorrhage had taken place. Microscopically the thickened mucous membrane showed the typical structure of gastric glands, almost entirely of fundal type and very rich in oxyntic cells. At either side of the patch a sharp transition to intestinal mucosa takes place where the mucous membrane returns to normal thickness.

This case is of great interest because it shows that a superficial heterotopia, innocent enough in itself, may lead to pathological changes which make it of the greatest clinical importance. It has many features in common with the peptic ulcers of Meckel's diverticulum (*infra*, p. 128). It is noteworthy that in this case ulceration occurred not in the aberrant glands, but in the adjacent normal mucosa, where the greatest destruction of tissue is seen. A possible explanation is that an active acid secretion formed by the heterotopic glands may have devitalized the neighbouring intestinal epithelium and rendered it susceptible to an infection which would otherwise have been easily overcome.

(*b*) *Deep Heterotopia.*—With the exception of those occurring in Meckel's diverticulum, the majority of cases of intestinal accessory pancreas are found in the jejunum. All three of my own cases were placed high in this portion of the gut. The aberrant tissue is almost invariably situated in the antimesenteric

border, and usually its structure shows a very complete degree of differentiation. As a rule it remains quite symptomless, but one case of the series deserves mention, as it appeared to be definitely responsible for symptoms.

A woman, aged 38, was admitted with symptoms suggestive of gastric ulcer. At operation no ulcer was found, but the stomach was very small and contracted; posterior gastro-enterostomy was performed. During the operation a curious hypersensitive condition was noted in the small bowel, which went into spasmodic contraction on the slightest touch. Examination revealed a small submucous plaque in the wall of the first loop of jejunum, and this was removed. Later histological examination showed the typical structure of aberrant pancreatic tissue.

In view of the disappearance of the patient's symptoms which followed, it seems likely that the heterotopic mass was the cause of them.

5. HETEROTOPIA IN MECKEL'S DIVERTICULUM.

Persistent remnants of the vitelline duct provide a fruitful source of epithelial heterotopia. Failure of the normal obliteration of this duct may give rise to varying conditions according to the degree of patency preserved. The most common of these is persistence of the proximal portion, with the formation of an intestinal diverticulum first interpreted correctly by Meckel (1812), and which now bears his name. It is important to note that in the early embryo, at the time when physiological separation of the vitelline duct takes place, this duct possesses an entodermal lining which has precisely the same potentialities for development as the intestinal entoderm itself. Abnormal stimuli which result in persistence of any part of the duct may at the same time determine abnormal differentiation of its epithelium; it is,

therefore, small matter for surprise to find numerous cases of epithelial heterotopia in the region of Meckel's diverticulum.

(*a*) *Superficial Heterotopia.*—Aberrant gastric tissue in this site has been described frequently in the literature. The present series includes seven cases, of which three were associated with deep heterotopia in the shape of aberrant pancreatic tissue. The gastric glands are found at the apex of the diverticulum, and if of large extent may line the major portion of it. None of my cases was productive of mischief, but there is, however, one condition of great clinical importance which is directly due to this type of heterotopia; this is the "peptic ulceration of Meckel's diverticulum" which has been reported on a number of occasions. Its clinical and pathological aspects have been fully discussed by Humbert (1924), who investigated seven cases of the condition. Six cases manifested themselves by repeated intestinal hæmorrhages and five went on to perforation, four of them into the general peritoneal cavity. All the cases occurred in young males, the age varying between eleven months and twenty-eight years, with an average of ten years. The oldest patient had had periodic small intestinal hæmorrhages since the age of six months. This symptom is emphasized as of great diagnostic importance, occurring as it does in young subjects without obvious cause. Treatment is essentially surgical, and should be undertaken as early as possible.

(*b*) *Deep Heterotopia.*—Aberrant pancreas in Meckel's diverticulum usually forms a grey or pinkish circumscribed tumour, which may lie entirely in the wall of the diverticulum or remain completely detached from it except for a fibrous mass which is continuous with

the subserous coat. Microscopically the tissue is typically of quite adult appearance, and frequently communicates by a duct or ducts with the lumen of the diverticulum. The danger of its presence in this situation is well exemplified by one of my three cases, in which the heterotopic mass became invaginated into the Meckel, producing acute intussusception.

A girl, aged 4, was operated on for an intussusception, the apex of which had reached the middle of the transverse colon, forming a visible and palpable tumour in the epigastrium. On reduction its apex was found to consist of what appeared to be a large intestinal polyp. On longitudinal section, however, it was seen that a short Meckel's diverticulum had been invaginated and completely inverted by a solid pedunculated mass attached to the serous surface at its tip. (Fig. 4.) The tumour thus formed had occluded the lumen of the gut and had passed forward as the apex of the intussusception. The diverticulum was excised and the bowel sutured. Good recovery.

Microscopically the tumour was found to consist of aberrant pancreatic tissue embedded in the middle of a subserous lipoma, the whole forming an oval circumscribed mass $\frac{3}{4}$ in. in length. The greatly swollen mucous membrane was extremely congested and largely destroyed, but could still be identified as of gastric type.

It is a reasonable suggestion in the above case that the presence of the tumour had stimulated irregular peristaltic movements in the diverticulum, which at a favourable moment carried the heterotopic mass into its lumen. Once invagination occurred the further developments are satisfactorily explained as an effort of the bowel to evacuate the foreign body. Yet it must be pointed out that invagination may take place independently of an actual tumour. The present series includes two such cases, where an inverted Meckel alone formed the apex of the intussusception. Curiously enough, in both of them the surface of the diverticulum was found to be clothed

with mucosa of gastric type. Unfortunately, in such cases the finer histological detail is obscured from mechanical causes, so that it is impossible to determine whether any inflammatory tumefaction had previously been present in the heterotopic glands.

6. HETEROTOPIA AT THE UMBILICUS.

Abnormal differentiation of an unobliterated vitelline duct may give rise to a number of aberrant structures in the neighbourhood of the umbilicus. The majority take the form of umbilical polypi with or without a central sinus leading backwards for a varying distance into the anterior abdominal wall. Typically they occur as raised sessile or pedunculated tumours up to an inch or more in diameter, though usually much smaller. They have a bright cherry red colour, and appear very like exuberant granulation tissue. The surface is moist and may secrete even large amounts of fluid, particularly when the mucous membrane is of gastric type. In one such case recorded by Tillmanns (1882) a pedunculated tumour the size of a walnut increased in size after each meal, and secreted quantities of clear fluid identical with gastric juice. As is to be expected, the majority of polyps consist of normal intestinal epithelium, and of thirty-eight cases collected by Stone (1923) only four contained gastric glands. My own series includes three cases of intestinal and one of gastric type.

Clinically the umbilical heterotopias are, in themselves, of little importance apart from the irritation due to constant friction and to the discharge of their secretions, and their excision is a matter of little difficulty. But the possibility of an associated intra-abdominal condition must not be overlooked. An anchored Meckel's diverticulum is a potential cause

of intestinal strangulation, just as is the fibrous band which persists in some cases, attaching the bowel to the anterior abdominal wall behind the umbilicus. In this connection the following case is instructive :—

A male, aged 20, was admitted suffering from acute intestinal obstruction. Laparotomy revealed an intense generalized purulent peritonitis and the abdomen was drained, further operation being precluded by the patient's condition. The case was thought to be possibly one of gangrenous appendicitis with perforation. Death occurred two days later.

Post-mortem examination showed strangulation of two loops of small intestine by a fibrous band passing from the apex of a Meckel's diverticulum four inches long to the abdominal wall behind the umbilicus. Above the obstruction the intestines were greatly distended, and showed an acute perforation with fæcal extravasation. At the umbilicus was a small, hard, reddish nodule the size of a pea, readily visible and palpable on the surface, and continuous with the fibrous band through the abdominal wall.

The presence of an umbilical tumour may therefore afford a useful diagnostic clue in cases of acute obstruction where the true condition would otherwise remain unsuspected. Indeed, from consideration of such tragic cases as the one just recorded it would appear reasonable to advise laparotomy even where no symptoms of obstruction yet exist. That such a course is justified is shown by the following recent case :—

A male child, aged 2, was admitted to the General Hospital with a history of slight discharge from the navel and occasional colicky pains. These were not evident on admission, the only abnormality on examination being a small, firm nodule no larger than a pea, situated at the umbilicus. At operation a short Meckel's diverticulum was found attached to the back of the umbilicus by a persistent tubular remnant of variable width. This was excised together with the umbilicus. The excised specimen is illustrated in Figs. 5, 6 and 7. Its lumen is seen to narrow rapidly towards the abdominal wall, where

it became too small to admit the finest probe. The point of communication with the surface could not be made out, though from the history one must have been present. Microscopically the diverticulum and patent tube are both lined by mucosa of intestinal type, which becomes very atrophic as the umbilicus is approached. The umbilical nodule appears to consist entirely of fibrous tissue covered by normal skin.

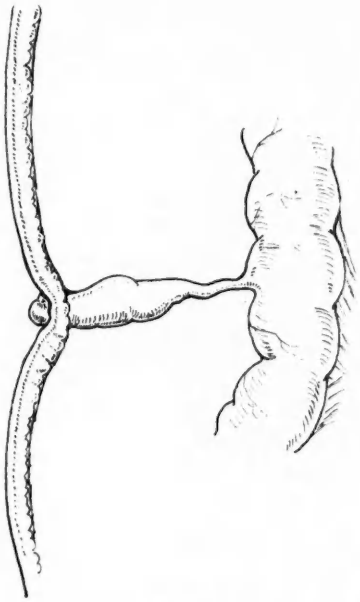

FIG. 7.

Drawing (semi-diagrammatic) of the persistent vitelline remnant illustrated in Figs. 5 and 6. The diverticulum arises from the side of the small bowel some distance from its mesenteric attachment.

SUMMARY.

1. Epithelial malformation of congenital origin occurs with considerable frequency in the alimentary tract. It is limited almost without exception to that portion of the gut which lies above the level of the ileo-cæcal valve.

2. The *superficial* heterotopias consist in a substitution of a portion of the normal mucous membrane by areas of mucous membrane foreign to that part but normal to some other intestinal region. They invariably show an adult structure, the only anomaly being one of situation.

3. The *deep* heterotopias may occupy any portion of the thickness of the bowel wall, and may produce tumour-like structures of characteristic naked-eye appearance. Microscopically they possess a varied structure, the most frequent constituent being pancreatic tissue. In all cases they contain only those types of cell which are normally found in some region of the alimentary tract. In some cases, as in adenomyoma, they show a marked lack of differentiation, with evidence of neoplastic activity. Nevertheless, they play no part in the production of malignant disease, and for this reason local excision only should be practised in all cases requiring operative treatment.

4. The *clinical significance* of the congenital heterotopias may be manifested in a number of ways:

(*a*) The superficial heterotopias of gastric mucosa in the small intestine and in Meckel's diverticulum may be the seat of ulceration with intestinal hæmorrhage and perforation.

(*b*) Certain deep heterotopias of the stomach and small intestine, notably the pyloric adenomyomas may produce symptoms suggestive either of gastro-duodenal ulceration or of cancer, and for which operation may be sought. Duodenal cases may rarely cause biliary obstruction.

(*c*) Nodules of aberrant pancreas at the apex of Meckel's diverticulum may produce mechanical obstruction of the gut.

(*d*) Umbilical polyps may produce discomfort or pain and an irritating discharge. Their association with potentially dangerous intra-abdominal malformations is emphasized.

I should like to express my best thanks to Mr. C. A. Moore, Mr. Duncan Wood and Mr. S. J. H. Griffiths for kindly allowing me to use their cases in this paper. I wish also to acknowledge my deep indebtedness to Professor M. J. Stewart, of Leeds, for permission to use his collected cases, including his valuable series of gastric ulcer and carcinoma.

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SOME DISORDERS OF MOVEMENT AND THEIR MECHANISM.*

BY

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IN practice we are frequently called upon to consider various types of motor disorder, which for purposes of diagnosis we must attempt to correlate with lesions in the nervous system. It is of some interest to know to what extent normal posture and muscle tone are determined by involuntary mechanisms within the nervous system, to distinguish disorders of movement which depend on lesions involving involuntary pathways from those which are due to disorders of pathways normally under volitional control. A complete survey of the subject is impossible within the limits of a short paper; nevertheless, some observations limited to a few clinical conditions may be of interest. In recent years a good deal of attention has been paid to certain disorders of motility, from the standpoint of altered muscle tone and posture, and the appearance of involuntary movements. Perhaps the most notable contributions have come from Kinnier Wilson in his Croonian Lectures. For our knowledge of postural reflexes we are mainly indebted to Magnus and Rademaker. The writer has drawn freely on these two sources in the present paper.

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In the first place it is proposed to discuss muscle tone and posture, also tremor associated with striatal disease ; then briefly to consider chorea and athetosis from the point of view of synergic control of muscle action in relation to the functions of the cerebellum.

Muscle Tone and Posture.—In order that we may follow the problems that arise it is necessary to take a brief survey of anatomical pathways involved and consider quite shortly the physiology of muscle control, as manifest in maintenance of muscle tonus and co-ordination.

The normal individual possesses his muscles in a state of ideal tone. This depends on influences reaching the anterior horn cells of the spinal cord from different levels of the nervous system. (Fig. 1.)

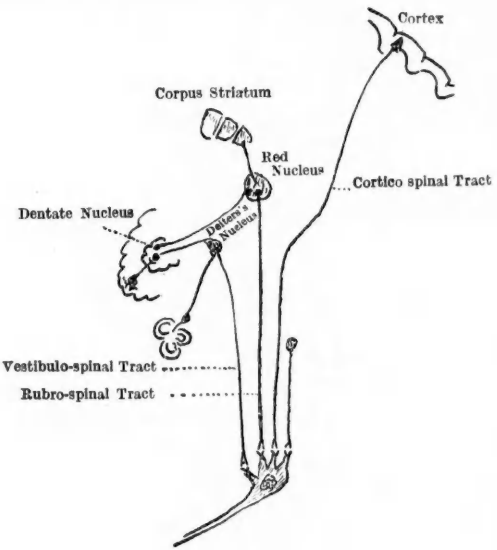

FIG. 1.

Diagram modified after Tilney and Riley. Indicating various neurologica levels influencing each anterior horn cell.

The group of clinical conditions which for the sake of brevity we refer to as instances of striatal disease is characterized by alterations of posture and muscle tonus and by abnormal movements.

Let us consider the problems of altered postural tone first. To understand them it is necessary to carry the inquiry beyond the limits of the corpus striatum. For well-ordered movement to take place it is necessary to have a background of correct postural tone. The mechanism for this is subcortical, and depends on pathways closely related to the mid-brain, to the red nucleus in particular. From this level an important pathway, the rubro-spinal tract, descends to anterior horn cells of the spinal cord. In animals subjected to spinal transection at the upper level of the medulla (Fig. 2), after the

FIG. 2.
Bulbo-spinal preparation. Exhibits spinal reflexes only.

FIG. 3.
Decerebrate preparation. Exhibits static postural reflexes and extensor rigidity.

FIG. 4.
Red nucleus preparation. Exhibits righting reflexes. Extensor rigidity is absent.

period of shock is over, general rigidity ensues and certain segmental reflexes can be elicited. If the transection is made at a higher level, namely above the entrance of the vestibular nerves, but lower than the red nucleus (Fig. 3), the rigidity takes on more complex characters. It is spoken of technically as decerebrate rigidity. The animal is now capable of standing after a fashion; all the extensor muscles

(antigravitational muscles) pass into a state of firm rigidity, so that the body weight, including the head and neck, can be supported. Further, such an animal now exhibits static postural reflexes.

In animals transected as described, and in whom labyrinthine reflexes are eliminated by destruction of the labyrinth on both sides, manipulations of the neck are followed by inevitable reflex changes in the posture of the limbs. Similarly in animals with the neck muscles firmly fixed by plaster of Paris but with labyrinths intact, alteration of the spatial relations of the head in different planes is followed by postural changes in the limbs. The above changes are known as static postural reflexes; the effective stimuli which produce them arise, in the first instance, in proprioceptive impulses from the neck muscles, and have their centres in the medulla and upper cervical segments of the cord. The second class of stimuli arise in the labyrinths, and have their centres in the bulb behind the entrance of the eighth nerve.

Supposing the transection of the brain stem is carried out farther forward still, headways of the red nucleus (Fig. 4), decerebrate rigidity is absent and the muscles possess normal tone. The flexors and extensors now share equally in the state of muscle tonus. Further, the animal now exhibits what are called righting reflexes; that is to say, it is capable of restoring itself to the correct position in space if placed in any abnormal posture. An analysis of these righting reflexes is complex and a detailed consideration is outside the scope of this paper.

It should be recognized, then, that the regulation of correct muscle tonus is inherent in the mechanism of the red nucleus and the spinal tracts descending from it. An experiment of Rademaker is interesting

in this connection. The rubro-spinal tracts decussate just caudal to the red nucleus in what is known as the decussation of Forel. Rademaker found that in an animal which had been transected in front of the red nucleus, and therefore possessing normal distribution of muscle tonus, section of the decussation of Forel in the median plane, which obviously must divide both rubro-spinal tracts (Figs. 5 and 6), was

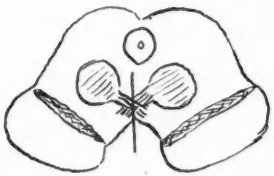

FIG. 5.

Diagram of transverse section of mid-brain showing decussation of Forel below the red nucleus.

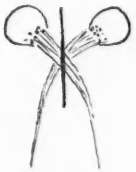

FIG. 6.

Diagram of decussation of Forel and Rademaker's median section, which produces extensor rigidity in red nucleus preparation.

immediately followed by the development of decerebrate rigidity. This experiment is fundamental, and shows the important part played by the red nucleus in the regulation of muscle tonus in animals.

It is dangerous to argue from experiments on animals as to the function of homologous neurological levels in man. Whereas in animals the rubro-spinal system is large and important, in man it is relatively insignificant. However, the experimental work, as far as it goes, establishes the principle that the regulation of muscle tonus is dependent upon an involuntary system in the region of the mid-brain. We are, however, immediately placed in difficulty when we come to consider striatal disease, in the light of physiological knowledge concerning the red nucleus. Effector pathways from the corpus striatum

are relaid at the level of the red nucleus. If, therefore, the corpus striatum is destroyed by disease the rubro-spinal system is released from control. One would expect from what has gone before that no abnormal rigidity would develop, since from experiments on animals we have seen that the rubro-spinal system inhibits excessive tonus. In man, however, excessive tonus is one of the leading characteristics of striatal disease. One is forced to the conclusion that in the process of evolution in man the inhibitory function of the red nucleus as regards postural tone has been shunted forward to the striate level, in other words, that the functions of the red nucleus have, in a considerable measure at least, been superseded.

Perhaps it is desirable at this point to say a word on the subject of neurological release. We must remember that destructive lesions cannot *per se* produce positive symptoms. As Kinnier Wilson puts it, a hole in the corpus striatum cannot produce anything. If, therefore, positive symptoms appear when a certain region of the brain is destroyed, the symptoms must depend on surviving systems escaping from inhibitory control. The hypertonus of the striate patient is, therefore, an instance of a release phenomenon.

The survival of the red nucleus in striatal disease in man is therefore insufficient to secure optimum tone, and rigidity is the rule. Nevertheless, the rigidity is evenly distributed to all muscles, flexors and extensors alike, manifest clinically as so-called lead pipe rigidity. This uniformity of hypertonus is possibly due to survival of the isolated rubro-spinal system. This harmonizes with Rademaker's observations on the red nucleus preparation. This

survival saves striate man from descending to the level of the decerebrate preparation in a state of extensor spasm.

Attitudinal reflexes are well seen in man in a number of pathological conditions, where the higher levels of the nervous system are cut off, as, for instance, in chronic hemiplegia, where flexion of the arm and extensor spasm of the leg are the rule. In such cases neck reflexes can be readily demonstrated as so-called associated movements. The subjects of the Parkinson syndrome tend to adopt a posture of general partial flexion. I suggest that the explanation is to be found in the light of postural reflexes seen in animals transected in front of the red nucleus. In these preparations neck flexion induces flexion of the limbs. In Parkinson's disease the patient's voluntary power is readily exhausted, he finds it difficult to hold the head up; consequently the neck droops forward under the weight of the head in spite of hypertonus of the neck muscles, subcortical postural reflexes are set up, and flexion is the characteristic static posture. In my experience the greater the flexion of the neck the greater the flexion of the arms. In the few Parkinson cases in which the head is held erect the arms tend to remain in extension by the side.

It should be noted that the cerebellum plays no part in the maintenance of postural reflexes. The experimental results in animals transected behind or in front of the red nucleus hold equally true for decerebellate animals. It would appear, then, that the rôle of the cerebellum is not manifest in the maintenance of static reflexes, in spite of its important connections with the red nucleus. It is in relation to the execution of voluntary movements that

cerebellar function becomes manifest. Cerebellar lesions show themselves, on attempt at movement, as inco-ordination, intention tremor, nystagmus, etc. While the cerebellum is to be regarded as the great co-ordinating or synergic mechanism for voluntary movement, it seems probable that it also plays a part in the maintenance of optimum muscle tone, for some degree of hypotonia is characteristic of cerebellar disorders. A number of the physical signs elicited in the examination of cases with cerebellar lesions depend on this; for instance, the pendular knee-jerk, static tremor of the head, intention tremor, pass pointing, etc., etc.

As regards intention tremor, while it affords an instance of tremor occurring in hypotonic muscles, its occurrence is not really dependent upon the existence of hypotonia, but is due rather to loss of automatic muscle control. If, for instance, a patient with his arm unsupported tries to keep his finger within an inch of his nose the oscillations of intention tremor rapidly develop. Owing to faulty fixation at shoulder and elbow steady pointing is difficult. The arm sags away from its primary position, to which it is restored again by voluntary effort. The process repeats itself over and over again, so that a rhythmical tremor is established.

Tremor.—Tremor is a simple movement of low physiological grade in which agonist and antagonistic groups of muscle contract and relax alternately. Although seen more usually in states of muscle hypertonus, it is also seen in hypotonic muscles, and must be regarded as a phenomenon which is largely independent of muscle tone. Further, it is set at a relatively uniform rate, and appears, therefore, to be a function of neurocellular activity. It is important

to note that the law of reciprocal innervation of muscles is strictly observed in tremor, in contra-distinction to the disorderly inco-ordination seen in chorea and athetosis. It seems not unlikely that the ultimate mechanism of tremor belongs to the spinal level (*cf.* clonus), and that tremor occurs when this level is released from the control of a centre or centres in the mid-brain, probably in the region of the red nucleus. The release of the mid-brain mechanism is seen *par excellence* in paralysis agitans. Tremor is prone to develop in striatal lesions and lesions of the superior cerebellar peduncle. Experimentally it has been produced by stimulation of the mid-brain. On the whole, evidence tends to place the tremor controlling centre in or near the red nucleus. What particular conditions of the centre are necessary for its production it is difficult to say, but one may state that the condition of muscle tone is not an essential factor, for tremor occurs in hypertonic muscles (paralysis agitans) and in hypotonic muscles (cerebellar lesions). On the other hand, complete atonia is incompatible with the development of tremor. No totally paralysed limb trembles, and if in a limb tremor exists on account of, say, striatal disease, subsequent hemiplegia stops the tremor during the succeeding period of shock. The tremor, however, returns later when the period of shock is over and muscle tonus returns. Another point to be noted about tremor is the fact that it is never produced by a purely cortico-spinal lesion; that is to say, the controlling mechanism is involuntary (supra-spinal) but not cortical. It requires, therefore, a destructive lesion of an involuntary system for tremor to appear as a release phenomenon. The view that the ultimate level of integration for tremor

is spinal accounts for the low grade and apparently purposeless character of the movements. The control by voluntary pathways over this mechanism, released from involuntary control, is fleeting and uncertain.

A consideration of paralysis agitans on the clinical side and of Magnus's thalamus preparations (animals transected headways of the thalamus and corpus striatum) (Fig. 7) throws light on the nature of

FIG. 7.
Magnus's thalamus preparation.
No extensor rigidity, no tremor.

the tremor-controlling mechanism. The Magnus preparations with corpus striatum intact never exhibited tremor. In paralysis agitans, with the corpus striatum destroyed, tremor is a constant phenomenon. The corpus striatum consists of two separate parts, the globus pallidus and the putamen. The former is developmentally the older, and contains large motor cells. It is probably concerned with primitive automatic movements, exercising its function through the medium of the rubro-spinal system. The putamen, on the other hand, exercises inhibitory control over the primitive pallido-rubro-spinal system. In destructive lesions of the corpus striatum this primitive mid-brain motor mechanism escapes from inhibitory control and tremor develops. In Magnus's preparation with the striate body intact no tremor develops.

The very imperfect control of voluntary pathways over the released tremor-producing mechanism is seen in the temporary cessation of movement which occurs on voluntary effort, and also in the fluidity of tremor which shifts from one group of muscles to another. In paralysis agitans at one moment the movements are flexion and extension and at the next moment pronation and supination, and no voluntary effort seems able to prevent such changes.

Seeing that there is a real anatomical difference between the lesions of paralysis agitans and the Parkinson syndrome, since in the former it is essentially the corpus striatum that is destroyed and in the latter the substantia nigra, we may reasonably ascribe a difference of function to these masses, corresponding to the difference in the clinical picture of the two conditions. In paralysis agitans tremor is let loose; in the Parkinson syndrome rigidity. Possibly the corpus striatum inhibits involuntary movements and the substantia nigra inhibits excessive tonus. The overlap in the clinical picture may be accounted for partly by mixed lesions of the two masses and their common focus of action in the red nucleus.

I wish to pass on now to the consideration of other types of disorder of movement, namely chorea and athetosis. We may take them together. They present two important features in common, namely the movements are relatively elaborate and complex, that is to say, they possess qualities we are accustomed to associate with activity of the cerebral cortex. They possess a further important feature, namely there is a complete abrogation of the law of reciprocal innervation.

This latter characteristic leads directly into the problem of muscle co-ordination or synergia. The

duty of presiding over the synergic action of muscles rests entirely with the cerebellum. It is necessary, therefore, to consider in some slight detail the physiology and anatomical relations of the cerebellum.

All afferent impulses from the muscles of the body pass to the cerebellar cortex. Here they are relaid to the cerebellar nuclei, notably the dentate nucleus. Efferent tracts have their cell stations in the cerebellar nuclei and leave via the superior peduncles, with the exception of the pathways to Deiters's nucleus, which leave by the inferior peduncles. Pathways from the cerebellum form three main groups (Fig. 8) :—

1. Through the crossed rubrothalamic pathway to the frontal cortex of the opposite side.

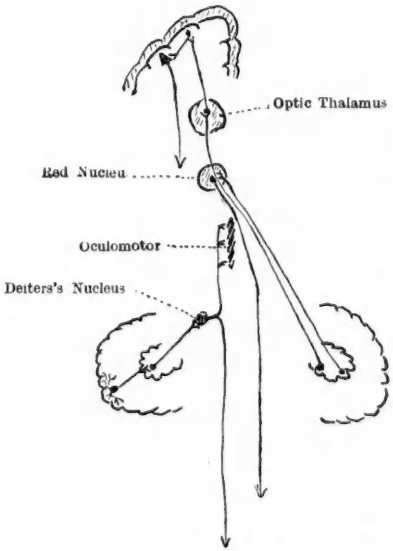

FIG. 8.
Efferent pathways of the cerebellum.

2. Through Deiters's nucleus, forming two groups of vestibular connections :—

(*a*) Some turn headwards in the posterior longitudinal bundle, to co-ordinate vestibular impressions with eye movements.

(*b*) Some turn downwards, forming the cerebello-vestibulo-spinal tract.

3. Through the red nucleus joining the rubro-spinal pathway.

The first of these pathways interests us in connection with the mechanism of chorea and athetosis. The second will claim our attention in relation to the mechanism of nystagmus. The third is related to the part played by the cerebellum in influencing muscle tone, a subsidiary but clinically obvious function of the cerebellum.

The main physiological function of the cerebellum is synergic control of muscle action. In any voluntary movement the following functional grouping of muscles is essential: prime movers, antagonists, synergists and fixators. Without this mechanism co-ordinate muscle action is impossible.

The interaction of the cortex and cerebellum is interesting and important. Before any voluntary movement can take place there must be the idea of movement initiated in the cortex.

Messages pass back from cortex to pons. There they are relaid by the pontine cells through the middle peduncles to the cerebellar cortex, and thence back again through the dentate nucleus to the frontal cortex. These last impulses convey the delicately adjusted mechanism for muscle synergia, and co-ordinate muscular action results, exteriorized by the pyramidal tracts. In other words, we think in terms of muscle sense.

Now it is this final pathway from the cerebellum to cortex which would appear to be disorganized in chorea and athetosis. In no other way can we adequately account for the essential characteristics, namely, elaborate movements of cortical type hopelessly disorganized by the loss of synergic control. This view is the one advocated by Kinnier Wilson. It is perhaps only right to mention that other theories have been advanced to account for chorea. For instance, lesions of the thalamus have been impugned. It is to be remembered, however, that the cerebellar route through the red nucleus to the frontal cortex passes through the thalamus, consequently a thalamic lesion is liable to produce muscular asynergia, and choreic movements may appear. This, however, in no way invalidates the thesis that ordinary rheumatic chorea, which is a rheumatic encephalitis, is due to outfall of cerebellar influence on the cerebral cortex itself.

A word must be added with regard to reciprocal innervation of muscles. In tremor, essentially a subcortical phenomenon, reciprocal innervation is observed. In ankle clonus a purely spinal mechanism is released. It appears, therefore, that the ultimate integration of reciprocal innervation belongs to the spinal level. This may be true, but it in no way precludes a higher neurological level from also exhibiting control over reciprocal innervation. That this higher level may reside in the cerebral cortex is demonstrated in the phenomenon of tonic innervation. In cases of chronic hemiplegia the patient may so far recover as to be able to grip with the paralyzed hand, but is unable to release his grip to order. The same phenomenon is seen in athetosis. That is to say, his cortical control is defective, and when he

attempts to use his extensor muscles the antagonistic flexors are not inhibited as they should be normally. The phenomenon of dysdiadokokinesis likewise lends support to the view that in cerebellar disease the cortex is deprived of the mechanism for quick synergic control, and in consequence there is an inability to repeat fine movements in rapid succession.

Time will not allow a separate discussion of athetosis, but the condition is so closely allied to chorea, and it is so obviously due to cortical lesions, that in the main what has been said of chorea holds good also for athetosis.

Nystagmus.—I propose to deal with the subject of nystagmus in a very general way, more particularly from the point of view of disordered cerebellar function, with which it is so often closely identified. Cerebellar nystagmus has as its foundation poor synergic control of the extrinsic ocular muscles. In conditions associated with cerebellar nystagmus the phenomenon is not seen when the eyes are at rest in the forward position, but is elicited on conjugate deviation. The muscles are in some degree hypotonic and synergic control poor. Consequently the new fixation point is not well held, and the eyes tend to swing back to the forward position, but are at once restored by voluntary effort to the position of lateral deviation, once more to swing back towards the middle line. There is difference in the rate of the two movements. The quick component is towards the lateral fixation point, and the slower swing back to the mid-line. In other types of nystagmus it is less easy to analyse the component movements because synergic action is not as a rule at fault. Nystagmus due to optical errors, such as anterior polar cataract, is present all the time, even with the eyes in the

forward position, and vestibular nystagmus is due to faulty integration of impulses between the labyrinthine connections and the ocular motor nuclei.

While the writer wishes to acknowledge his indebtedness to the works of Kinnier Wilson and Magnus, it should be understood that they are not in any way responsible for the views expressed in the present paper.

BIBLIOGRAPHY.

Kinnier Wilson: Croonian Lectures, *Lancet*, July, 1925.
Magnus: Cameron Prize Lectures, *Lancet*, May, 1926.

STRANGULATED HERNIA.

BY

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THE following data have been drawn from an analysis of the cases of strangulated hernia* (inguinal, femoral and umbilical) admitted to the Bristol Royal Infirmary during the years 1927-1929 inclusive :—

Age incidence.—

	Inguinal.	*Femoral.*	*Umbilical.*	
First decade	4	0	0	= 4
Second ,,	0	0	0	= 0
Third ,,	1	0	0	= 1
Fourth ,,	2	1	0	= 3
Fifth ,,	5	7	0	= 12
Sixth ,,	10	5	3	= 18
Seventh ,,	15	7	2	= 24
Eighth ,,	5	9	2	= 16
Ninth ,,	2	1	0	= 3
Totals	44	30	7	= 81

Sex incidence.—

	Inguinal.	*Femoral.*	*Umbilical.*
Male	39	9	2
Female	5	21	5

Duration of hernia history.—Of the cases (58) in which a history was available on this point, in nine cases the hernia had been noticed for less than a

* Made at the request of the Association of Surgeons of Great Britain and Ireland.

week, in five for a period of between one week and one year, and in forty-four cases of over one year.

In one case of femoral hernia in a woman aged 51 years at the time of strangulation a radical cure had been performed six years previously; she stated that the hernia recurred almost at once. In one case of inguinal hernia the patient said that he had been operated on while in the army; his hernia recurred in less than a week from the time of his operation.

Principal symptoms.—It is perhaps worthy of note that in three cases in this series the patient complained of retention of urine; in one case it appears to have been the sole symptom of which he complained. This case is referred to again later on in this report. In the other two cases additional symptoms were complained of, which could be definitely referred to the irreducible hernia that was present. In this connection I suggest that in cases of retention of urine which are associated with an irreducible hernia it would be sound practice to explore the hernial sac.

Anæsthetics.—These were as follows:—

C. and E.	73	cases.
Ether	1	,,
Gas and oxygen ..	5	,,
Novocain	2	,,

In no case was a spinal anæsthetic given.

Operation.—Throughout this series of cases a modified Bassini operation was always done in cases of inguinal hernia, where the condition of the patient permitted it; and similarly in cases of femoral hernia a Lotheissen's operation was performed. When a resection was necessary and an anastomosis made, an end to end union was effected in every case except one, which was done by the side to side method.

Mortality.—Out of the 74 cases of inguinal or femoral hernia ten, or 13·5 per cent., died. In six of these cases the patient was profoundly ill on admission, and died within a few hours of the operation; it is difficult to imagine by what means their lives could have been saved. In two of these cases an incision was made into the bowel and fluid contents were allowed to escape; in one case it was apparently done on purpose, in the other case it is not clear whether it was done purposely or accidentally on opening the sac.

In the remaining four fatal cases it is possible to wonder whether some alteration in treatment might have achieved a different result. They were:—

(*a*) One case of "reduction *en masse*" of a strangulated hernia during the course of an operation.

(*b*) One case where apparently the patient's sole complaint on admission was retention of urine (the bladder being at the level of the umbilicus). It is interesting that it was found to be impossible to catheterize this man under an anæsthetic, and a supra-pubic incision had to be made; proving that there were good grounds for supposing that he might be suffering from retention of urine, without taking his irreducible hernia into account. An interval of some thirty-six hours elapsed between the supra-pubic incision and the exploration of the hernial sac, when the whole of the ascending colon was found to be gangrenous, and the patient died in a few hours after resection had been carried out.

(*c*, *d*) Two cases of manual reduction of strangulated hernia. In the first case forty-eight hours after the manual reduction of a strangulated hernia the patient developed peritonitis, and on laparotomy a loop of gangrenous intestine with three perforations was found. In the second the patient developed signs of an acute abdominal crisis subsequent to the manual reduction of a strangulated hernia. On exploration a gangrenous mass of intestine and mesentery was found to be bleeding profusely. These two cases suggest that house-surgeons and students should be taught on no account to attempt the manual reduction of a hernia exhibiting signs of strangulation.

Out of the seven cases of umbilical hernia two died, giving a mortality of 28·6 per cent.

Post-operative complications, etc.—In this series there was no case of perforation, intestinal hæmorrhage, or femoral thrombosis subsequent to the operation.

The only important pulmonary sequelæ were pneumonia in one case, that of a male aged 80, who died two days after the operation; and severe bronchitis in another patient, who was transferred to medical ward and recovered.

In one case 40 c.c. of anti-gas-gangrene serum were given; the patient recovered.

The average stay in hospital for inguinal and femoral cases was 13 days; in the umbilical cases 25 days.

Reviews of Books

Conduct of Life Assurance Examinations. By E. M. Brockbank, M.D., F.R.C.P. Pp. viii., 172. London: H. K. Lewis & Co. Ltd. 1931. Price 7s. 6d.—To all who are engaged in the practice of examination for life assurance this book will prove a treasury of information. The details of the physical examination of the patient and the tests for albumen and sugar in the urine will be useful to the young practitioner, whilst all who take an intelligent interest in insurance work will read with benefit the author's remarks on impaired lives, overweight, hereditary disease, venereal disease, glycosuria and the various forms of albuminuria. The author's wide experience of insurance work enables him to give many valuable hints to the general practitioner, and to explain many small points in insurance procedure which are not always clear to the medical examiner. For the estimation of blood pressure Dr. Brockbank is an advocate of the mercurial sphygmomanometer, the auscultatory method, and recording the diastolic pressure at the point of complete silence. His remarks under "Radical Mastoid Operation" are obviously intended to apply to simple mastoidectomy, not the radical operation.

The Medical Annual, 1931. By Carey F. Coombs, M.D., F.R.C.P., and A. Rendle Short, M.D., B.S. Pp. xcix., 604. Illustrated. Bristol: John Wright & Sons Ltd. 1931. Price 20s.—The great importance of *The Medical Annual* to the practitioner does not need emphasis, for it provides the only way by which he can discover the useful new or improved methods of diagnosis and treatment which are scattered over the current literature of the medical world. To help the busy man still more the introductory chapter gives a summary of the most important advances of the year, and a marvellous index extends to nearly thirty pages of small type. Besides this there are lists of new books and appliances and the addresses of all kinds of institutions, homes, and medical

societies. The present volume has a new departure, a section on diseases of the teeth, which will be welcomed by many readers. Among fresh methods of treatment we notice dehydration in severe epilepsy, the use of lactic acid in spring conjunctivitis, and of stramonium in post-encephalitic troubles. We find useful warnings about the spread of glandular and some forms of undulant fever, and botulismus. Great advances, too, are being made in the leukæmic diseases and in those connected with calcium metabolism. The ultimate results of gastro-enterostomy in 2,600 cases gives much food for thought and the abstract of the subject will interest most readers. Many of us know little of the powers of local authorities in the registration of nursing homes and as to the records which they can insist on being kept. This matter, and the necessity of medical practitioners registering their houses if they take in invalid patients, are discussed in a very useful article. The beautiful plates and illustrations in this volume are very numerous and most helpful.

The History of Medicine. By BERNARD DAWSON, M.D., F.R.C.S. Pp. xiv., 160. 31 illustrations. London: H. K. Lewis & Co. Ltd. 1931. Price 7s. 6d. This little volume comprises a course of seven lectures given to junior medical students in the University of Adelaide, N.S.W. Attendance on them was voluntary, but they were so popular that "all the students attended all the time." The author has given a very brief but good account of the gradual growth of medicine and surgery from prehistoric times to the present day, showing how it has been affected by the ups and downs of political history and by the lives of the great leaders of thought. The short sketches of the lives or work of these latter are admirable—Galen, Hippocrates and Avicenna are as interesting as Vesalius, Harvey and Hunter. A good deal of space had to be given up to explain the social and political state of each period, and on the whole this has been successful and clearly expressed, though we may not always agree with his view of history. We should have liked some reference to the debt the Arabist medicine owed to Indian Buddhism and to the influence of the school of Gondishapor, and again the revival of hospitals in the eighteenth century, and the growth of medical schools and societies should not be forgotten; but the author has done well to limit his subjects, and he has succeeded in writing a most interesting story.

Pye's Surgical Handicraft. By H. W. CARSON, F.R.C.S. Tenth Edition. Pp. xviii., 641. 343 illustrations. Bristol: John Wright & Sons Ltd. 1931. Price 21s.—We welcome the appearance of another edition of this well-known work. It is now seven years since the last revision took place, yet without sacrificing the individuality of its original author, this surgical classic has once more been brought into line with modern progress. The Editor, Mr. Herbert Carson, whose untimely death took place before this volume left the press, has been meticulously careful in his work of revision, and he has been assisted by a number of distinguished specialists who have reviewed their particular subject. One small omission to which we would call attention is the absence of any mention of the use of the de Pezzer catheter in the treatment of acute urinary retention. We have nothing but praise for this work, which should find its place on the bookshelves, not only of house surgeons, for whom it was primarily intended, but of every general practitioner.

Radium Therapy: Principles and Practice. By G. E. BIRKETT, M.C., M.R.C.S. Pp. x., 186. 52 illustrations. London: Cassell & Co. Ltd. 1931. Price 17s. 6d.—A special interest attaches to this book as it represents the ripe experience of one who had devoted the latter years of his life to the study of this subject, and who died suddenly and unexpectedly when this work had been completed. The book is eminently practical and clinical, and therefore the theoretical physics underlying the action of radium is reduced to a minimum. The general attitude of the author towards the subject is one of a very sane and moderate optimism. We must be content for the present to treat and alleviate the sufferer from cancer, but we cannot yet claim to cure the disease. The methods of protection are rightly given in some detail. The possibility of burns of the skin or of necrosis of the bone coming on at long periods after exposure is interesting and rather depressing. In cancer of the mouth radium gives just as good or better results than excision, with much less mutilation. The problem of the glands is, however, very difficult. It is here suggested that a block dissection should be done and radium needles implanted in the wound in all cases when glands are palpably affected. It is not considered that such treatment will cause any difficulty in wound healing. In cases where there is no manifest affection of the glands an external application is sufficient. In regard to the breast we are glad

to note that it is stated that there is no justification for withholding operation from early and favourable cases. The opinion in regard to the value of radium in cancer of the rectum is a very guarded one, and it is only in regard to epitheliomata, cancer of the cervix and certain sarcomata that the author is really enthusiastic. He holds that there is no justification for the practice of routine biopsy, because this operation has a bad effect on the growth, whilst it greatly increases the liability to dissemination. The book is a model of clear teaching and is full of excellent figures.

Among the Thinkers. By J. A. LINDSAY, M.D., F.R.C.P. Pp. ix., 197. London: H. K. Lewis & Co. Ltd. 1931. Price 5s.—Dr. Lindsay follows Lord Morley's cue: "A book which is worth reading is worth taking notes from." Writers draw alike from the cisterns of study and the springs of genius. Into that discursive book *The Doctor* Southey threw his collectanea. Sir Thomas Browne can be found in the rough in his commonplace books. If we have fagged and forgotten good things spoken, written or copied, yet, one who sold his library and kept his billiards we counted already dead to the depth and grandeur of life. This volume is such an anthology as a man of experience might leave to his friends. Here are the old oracles with the savour of their classic speech: latest exponents, too, of the themes of human faculty, character and suffering. We envy the author his first glow in transcribing many of these passages and aphorisms—acute and various as the conversation of Solomon's table.

Primary Syphilis in the Female. By THOMAS ANWYL DAVIES, M.D. Pp. x., 111. Illustrated. London: Oxford University Press. 1931. Price 12s. 6d.—This is a comprehensive and sound survey of a subject which has been inadequately treated so far in the literature. There are so many features of outstanding merit that it is difficult to select anything for special mention unless perhaps the excellent plates and illustrations. The author does not hesitate to break away from some of the historic ideas as to the commonest sites for genital sores. His dogmatic reference to the cervix is most refreshing in this connection, where his large experience must be unique. This book will be welcomed by all medical men as a solid contribution to this difficult subject. The amount of work devoted to the book, even allowing for the author's generous acknowledgment of help from others, must have been enormous, and the result is most successful.

Editorial Notes

Royal Society of Medicine. Section of Anæsthetics.

On the 7th of March the Anæsthetic Section of the Royal Society of Medicine held a meeting in Bristol. After visiting No. 6 Dowry Square, the house in which Humphry Davy discovered the anæsthetic properties of nitrous oxide gas, the members went to the University, where, through the hospitality of the Vice-Chancellor, the Physiological Department and the Reception Room had been placed at their disposal. The proceedings took the form of a symposium on the use of the barbiturates in anæsthesia, the subject being discussed from its chemical, physiological, pharmacological and clinical aspects.

The audience especially appreciated the scientific introductory remarks of three members of the University teaching staff, Dr. Nierenstein in chemistry, Professor Brocklehurst in physiology, and Mr. Taylor in pharmacology. The interest taken in the subject was evidenced by the large attendance of members and guests from London, Birmingham and the Bristol district, many of whom subsequently expressed the opinion that the meeting had illustrated the value of close co-operation between clinical and academical departments.

* * * * *

Paul Bush Gold Medal.

THE Committee of the Bristol Royal Infirmary announces that a gold medal has been instituted to perpetuate the memory of the late James Paul Bush. The medal will be awarded in alternate years to the Resident Medical Officer (other than the Senior Resident Officer) who during the two years preceding the date of the award shall be adjudged to have performed his or her duties most efficiently and with greatest advantage to the Bristol Royal Infirmary. The first award has been made to Terence Astley Brand, M.D. (Bristol).

* * * * *

President's Badge, Bristol Medico-Chirurgical Society.

A PRESIDENT'S badge has been given to the Medico - Chirurgical Society by Dr. Kenneth Wills, who occupied the Chair in 1929–30. The badge consists of a silver-gilt plaque bearing three shields with the coats of arms of the City of Bristol, the Bristol University, with their respective mottoes, and a representation of the University Tower, all in coloured enamel. Underlying and supporting the shields are two staffs of Aesculapius, with twined serpents. A circular border bears the name of the Society, while the date of its founding, 1874, is prominent at the base of the shields. At the top is a ring supported by a motive of the Bristol crest, a helm and crossed arms, bent, with a serpent and scales. Round the rim of the whole is a relief design of dolphins and laurel leaves.

This beautiful badge of office will enhance the dignity of the Presidency of the Society, which is

PLATE V

deeply indebted to Dr. Wills, not only for his generous gift, but also for the happy thought that prompted it.

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Colston Research Society.

THE Annual Dinner of the Colston Research Society was held at the University of Bristol on Friday, 15th May, under the presidency of Mr. George A. Falk, and was attended by more than one hundred members and subscribers. The two principal guests were Professor J. Barcroft, C.B.E., F.R.S., Professor of Physiology at Cambridge University, and Dr. R. E. M. Wheeler, M.C., M.A., D.Litt., F.S.A., Keeper and Secretary of London Museum. The general collection was announced as £892 18s. 5d., an excellent figure which has since been slightly increased. The Napier Abbot Memorial Fund for research in Arts has received additional donations, and now stands at £1,870.

As the result of the President's appeal for a trust fund for research in Medicine, Mrs. Yda Richardson, who has in the last four years been a most generous supporter of the cardiac research work at the General Hospital, assisted by the Society, offered the sum of £2,500 if a further £2,500 were found elsewhere. By the dinner £2,000 had been promised in sums of £500 each from the President, Lord Dulverton, Mr. H. W. Gunn and Mr. F. C. Burgess, and shortly after two sums of £50 each from Dame Janet Stancomb Wills and Mr. Edward Robinson, and an anonymous donation of £400 completed the fund. The Society is now, therefore, in possession of £5,000, of which the income is to be applied in perpetuity for the assistance

of research in Medicine as approved from time to time by the Council of the Society. The purpose to which the resources of the fund shall be applied in the first instance is now under consideration.

Meetings of Societies

Bristol Medico-Chirurgical Society

The seventh meeting of the session was held at the University on 8th April, 1931. The President was in the Chair.

Dr. G. B. BUSH showed and described X-ray films, Dr. A. D. FRASER pathological specimens, and Mr. GRIFFITHS and Dr. ROGERS a microscopic specimen of a sarcoma arising from the stomach.

Dr. A. L. TAYLOR then gave a paper on some **"Intestinal Abnormalities and their Clinical Significance,"** illustrated by lantern slides and specimens. This paper appears in the current issue.

In the discussion that followed the President inquired whether diverticula of the Fallopian tube were of the nature of heterotopias, and whether adeno-myomata of the uterus containing endometrial tissue were of the same class.

Dr. ROGERS congratulated Dr. Taylor on his work on the heterotopias. He remarked that while transplants in the anterior gastric wall took well, with no ulceration, ulceration occurred if the site were the lesser curvature, and suggested that multiple ulceration of the stomach might be due to multiple heterotopia. He also drew attention to the fact that repeated intestinal hæmorrhage may be one of the complications of Meckel's diverticulum, and quoted illustrative cases emphasizing the possible diagnostic importance of such hæmorrhage, notably in male children.

Dr. FRASER inquired whether heterotopiæ were found in the appendix.

Mr SCARFF inquired whether the small white lines seen through the œsophagoscope sometimes in cases of dysphagia occurring in women of about forty, might represent heterotopic patches of gastric mucosa.

Dr. TAYLOR, in replying, said he had no certain knowledge of Fallopian diverticula, but considered that they were propably of a post-inflammatory nature. He saw no reason for the belief that adenomyoma of the uterus was of fœtal origin, but regarded it as of an acquired type. He agreed that repeated intestinal hæmorrhage in male children should suggest the possibility of peptic ulceration of a Meckel's diverticulum. He thought diverticula of the appendix were of the nature of pressure diverticula, as their microscopical structure showed that they were protrusions of mucous membrane through a damaged muscular wall. He considered it highly unlikely that the lines seen in the œsophagus were heterotopic in origin, and queried whether an actual ulcer had ever been seen in such cases.

The eighth and final meeting of the session was held at the University on 13th May, 1931. The President was in the Chair.

Dr. F. J. A. MAYES showed a number of X-rays, Dr. A. L. TAYLOR pathological specimens, and Mr. BUSH and Dr. SUMMERS an X-ray print of a dermoid cyst.

Dr. H. C. BRISTOWE then read a paper on **"Sterilization of the Unfit,"** which will appear, with the ensuing discussion, in the next issue of the *Journal*.

The Medical Library of the University of Bristol,

WITH WHICH IS INCORPORATED

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the list in February, 1931.

	June, 1931.
Messrs. Allen & Hanbury (1)	1 volume.
American Laryngological Association (2) ..	1 ,,
American Laryngological, Rhinological and Otological Society (3)	1 ,,
Dr. W. B. Crow (4)	1 ,,
Dental Board of the United Kingdom (5) ..	1 ,,
Professor E. W. Hey Groves (6)	5 volumes.
Henry Phipps Institute (7)	1 volume.
Michell Clarke Memorial Fund (8)	2 volumes.
Otago University Medical School (9) ..	1 volume.
Surgeon-General of the U.S. Army (10) ..	1 ,,

Unbound periodicals have also been received from Professor E. W. Hey Groves.

THE ONE HUNDRED AND THIRTY-SIXTH LIST OF BOOKS.

The figures in round brackets refer to the figures after the names of the donors. The books to which no such figures are attached have either been bought from the Library Fund or received through the *Journal*.

Birkett, G. E.	*Radium Therapy*	1931
Borghi, M.	*Il Comportamento Istologico dei Trapianti Ossei Autoplastici Viventi in Sede Ossea Chiusa*	1930
Brash, J. C.	*The Ætiology of Irregularity and Mal-occlusion of the Teeth* .. .. (5)	1931
Corner, G. W.	*Anatomy*	1930
Cripps, E. C.	*Plough Court* .. .. (1)	1931
Crow, W. B.	*Principles of Morphology* .. .. .. (4)	1929
Davies, T. A.	*Primary Syphilis in the Female*	1931
Dawson, B.	*History of Medicine*	1931
Dawson, W. R. ..	*The Beginnings—Egypt and Assyria*	1930

Floyer, Sir J.	*Inquiry into the Uses and Abuses of the Hot, Cold and Temperate Baths in England*	(8)	1697
Fulton, J. F.	*Physiology*		1931
Iredell, C. E.	*Colour and Cancer*		1930
Klapp, R., and Block, W.	*Die Knochenbruchbehandlung mit Drahtzugen*	(6)	1930
Lindsay, J. A.	*Among the Thinkers*		1931
Matti, H.	*Die Knochbrüche. 2te Aufl.*	(6)	1931
Nesfield, V.	*Deafness and its Alleviation*	2nd Ed.	1931
Power, Sir D'Arcy	*Medicine in the British Isles*		1930
Rawling, L. B.	*Stepping-Stones to Surgery*		1930
Rolleston, Sir H.	*Internal Medicine*		1930
Pye, W.	*Surgical Handicraft*		1931
Spencer, W. G., and Cade, S.	*Diseases of the Tongue*	3rd Ed.	1931
System of Bacteriology		Vols. 6 and 8 (8)	1931
Thomson, Sir St. C., and Colledge, L.	*Cancer of the Larynx*		1930
Wilson, G. E.	*Fractures and their Complications*	(6)	1931
Yeomans, P. W.	*Happy Motherhood*		1931

TRANSACTIONS, REPORTS, JOURNALS, ETC.

American Laryngological Association, Transactions. Vol. 52	(2)	1930
American Laryngological, Rhinological and Otological Association, Transactions. Vol. 36	(3)	1930
Henry Phipps Institute, 22nd Annual Report	(7)	1930
Index Catalogue of Surgeon-General's Library. 3rd Series. Vol. 9	(10)	1931
Medical Annual, 1931		1931
Ophthalmological Society of the U.K., Transactions. Vol. 50		1930
Progressive Medicine, March, 1931		1931
Quarterly Cumulative Index Medicus. Vol. 8		1931
Report on Sanitary Department, Gold Coast, 1929–30		1930
Société Internationale de Chirurgie, 8me Congrés. Vol. 2	(6)	1930
Surgical Clinics of North America, February and April, 1931		1931
University of Otago Medical School. Proceedings. No. 8	(9)	1931

Local Medical Notes

EXAMINATION RESULTS.

University of Bristol.—Students of the University have recently passed the following examinations :—

M.D.—S. Datta.

M.B., CH.B. (*Part I.*).—*Second Examination. Pass :* V. T. Baxter. *In Elementary Anatomy only :* D. S. Prichard. *In Organic Chemistry only :* Ursula W. Wood.

M.B., CH.B. (*Part II.*).—*Second Examination. Pass :* G. L. L. Gurney, T. R. V. Gurney, Irene G. Hamilton, F. J. W. Lewis, C. H. G. Price.

M.B., CH.B. (*Part I.*). — *Final Examination. Pass :* H. M. F. Finzel (with distinction in Materia Medica, Pharmacy,

Pharmacology and Therapeutics, and Forensic Medicine and Toxicology), J. J. Kempton, R. L. Marks.

M.B., CH.B. (*Part II.*).—*Final Examination. Pass:* Elizabeth S. G. Owen (with Second Class Honours), L. P. Ashton (with distinction in Surgery and Obstetrics), J. E. Brown, L. R. Jordan (with distinction in Medicine), R. H. Moore. *In Group II. (Completing Examination):* Eveline M. D. M. Collinson, Rowena M. Hickman. *In Group I. only:* W. A. F. Taylor. *In Group II. only:* O. J. P. Bollon.

B.D.S.—*Second Examination. Pass: In Anatomy and Physiology and Histology (Completing Examination):* J. W. E. Snawdon.

B.D.S.—*Final Examination. Pass:* M. J. Ryan.

PRELIMINARY SCIENCE EXAMINATION FOR DENTAL STUDENTS.—*In Chemistry and Physics only. Pass:* R. E. Buchan, Frances M. Orton.

L.D.S.—*First Professional Examination. Pass: In Dental Anatomy (Completing Examination):* J. H. G. Smith. *In Anatomy and Physiology only:* J. G. Clancy.

L.D.S.—*Second Professional Examination. Pass: In Dental Mechanics and Dental Metallurgy (Completing Examination):* G. N. Minifie. *In Dental Mechanics and Dental Metallurgy only:* R. L. Royal. *In Dental Materia Medica only:* I. R. R. Eskell.

L.D.S.—*Final Professional Examination. Pass:* E. V. O'Hara.

Conjoint Board—M.R.C.S., L.R.C.P.—*In Chemistry and Physics:* J. G. Jones, J. H. Bulleid. *In Chemistry only:* Mabel L. Glenny. *In Anatomy and Physiology:* C. H. G. Price. *In Pharmacology and Materia Medica:* A. F. Fowler, D. P. Dewe, W. R. Cambridge. *In Medicine:* R. G. Wilbond,* R. H. Moore,* D. Johnson, H. L. Cleave,* Elizabeth S. G. Owen.* *In Surgery:* H. L. Cleave,* L. C. Holland, Yolande M. de la Pasture,* Elizabeth S. G. Owen,* Ida B. Saxby.* *In Midwifery:* D. Johnson, H. L. Cleave,* Yolande M. de la Pasture,* N. C. Coombs, F. W. A. Fosbery, R. V. C. Richards.*

L.D.S., R.C.S.—*First Professional Examination. Part I. (Dental Mechanics):* D. Gent. *Part II. (Dental Metallurgy):* D. Gent, J. D. Rees, H. F. Vere, B. H. W. Baker, A. C. Davies, L. Jonathan, N. E. Miles, G. L. R. Welch. *Part III (b). (Dental Anatomy and Physiology):* S. A. McCandlish.

* Qualified.